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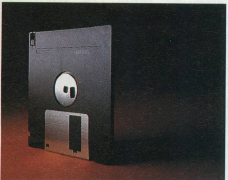




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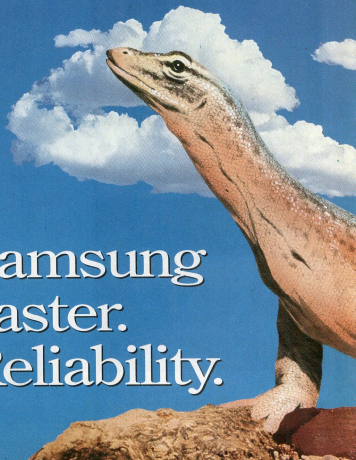
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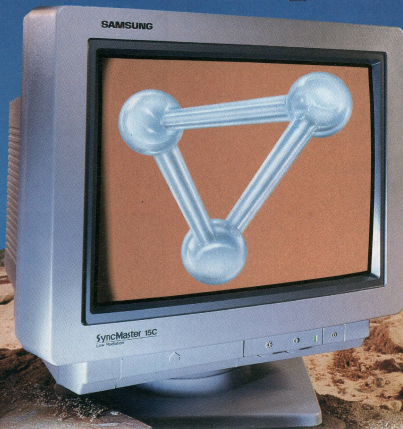
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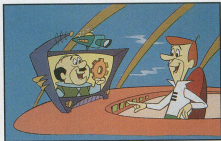
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# PC93's digital carnival

If you thought flavours of the year were multimedia and Pentium chips, you would have been right, at Sydney PC93 in March. But by the time the digital carnival reached Melbourne five months later, all had changed.

Certainly, multimedia was still a major presence. Creative, Lako, Chips and Bits — they all had the latest one-pack upgrade kits on offer

seemed to have taken over as the hot number in the Melbourne PC93 marketplace.

The main evidence of this were the two major stands glowing at each other across the north entrance foyer. Telecom and Optus.

Neither had a whole array of PCs, and neither was pushing any software. They were talking integrated communications technology, with ISDN, voice mail, network services

host of other manufacturers were offering modems slightly larger than keyrings that work at 9600bps.

Infrared links from HP, wireless LANs from Toshiba; data exchange was definitely the big issue. Even the Apple Newton and Sharp's Expert Pad seemed to be citing communication capability as a major selling point in their demonstrations. Data storage was also a noticeable player with Verbatim, SCSI, Pinnacle and 3M all claiming bigger and better optical technology — up to 128M on a 3.5in floppy with 28ms access time — not bad! Monitors also seemed to be getting bigger, sharper and cheaper with some impressive items on show from Viewsonic, Philips and Labtam.

But still the messages came back to communications, business advantage and timely exchange of information. If PC93 is anything to go by, computers seem to have left the power craze behind and started to become useful tools in their own right.

About time.

**Jeremy Torr**

## Film censorship board proposes regulation of computer software

The Office of Film and Literature Classification has been asked to review the rules relating to violent and explicit material contained in com-

### Round-up

Overall, the computer industry looks rather like the Australian economy.

Things are starting to get better but the bad news is still coming thick and fast. Some sectors are showing an improvement, but it is patchy. Even though nobody was expecting good news from IBM, the size of the company's loss for the second quarter of 1993 was staggering. In the first quarter since the new CEO, Gerstner, took control, IBM lost \$413 billion. The company is to shed more staff and is still looking at rationalising its manufacturing facilities.

Meanwhile, in Australia IBM used the Melbourne PC93 show as a venue to launch new machines. Among these was its Green PC. This computer shows what can be done to reduce power consumption in a PC, but it is not going to sell in high volume. The price at the moment is just too high. As it has been in the last few PC shows, multimedia was the star at the Melbourne PC93. An interesting sidelight on this is the growth in interest in pornographic material. The stands stocking soft porn at PC93 apparently did very well. Both Apple and Sharp used PC93 to publicly display their Newton-based handheld computers.

Both the Apple MessagePad and the Sharp Expert Pad are the same except for the name. However, the Sharp is selling for \$100 less than the Apple MessagePad's \$1499.



Communications topped multimedia as the hottest topic at the PC93 show in Melbourne last month

with CD-ROM drive, sound card and all the bits for an MPC upgrade. Definitely, there were video camera links, frame grabbers, genlocks and speakers blasting on stand after stand.

In spite of these, the accent had swung away from bigger, faster, more powerful technogizmos to plain old business advantage. Communications

and optical links. Smaller companies such as CPS were offering totally integrated and automated fax, voice and data routing and storage over any LAN and PABX using a Windows interface. Securis was demonstrating a live video conferencing system which could be used via a modem across standard phone lines into any PC. And Fosh and a

The general consensus among the industry pundits seems to be that the Newton technology is brilliant but there are still a few holes in it. Some have not been impressed with the handwriting recognition. However, the big question seems to be the communications of the MessagePad and Expert Pad. In the US, the telecommunications environment is richer than it is here. There, Apple has formed alliances with a number of carriers to supply these capabilities. The success of the MessagePad and Expert Pad in Australia will depend on how well alliances with carriers here work out.

Meanwhile Apple also brought out two new machines in its Macintosh line. The Quadra 840AV and the Centris 660AV are both equipped with new audio features. Both machines incorporate PlainTalk, Apple's speech technology. This gives them some speech recognition capabilities so that the user can issue simple commands verbally. As well, the machines can convert text to speech. The Centris can also act as a hands-free telephone.

Direct marketer Dell also dropped the prices of its hardware last month. Under the new regime a 486SX machine now costs just a little over \$2000. Plainly, Dell is finding competition in the Australian market tough. APC's sister trade weekly, *PC Week*, recently revealed that Dell has only managed to sell some 2000 machines since it set up here at the beginning of this year.

While Dell is unable to shift its hardware, Microsoft seems unable to hold onto its software. In a shock announcement in the middle of August, Microsoft's managing director, Gary Jackson, resigned. He held the position for just over a year after he took over from David Miller who only lasted some six months in the job.

At the same time, long-time managing director of WordPerfect Pacific, Doug Rutan, announced that he would be leaving the company in January next year.

**Jeremy Horey**

puter games and other software.

Improved screen resolution has meant that explicit sexual and violent computer games have enjoyed a rise in popularity and have proliferated, causing concern about the lack of restriction or adequate warning about their contents.

Chief censor, John Dickie, has proposed a classification system similar to the one currently in place for video and printed material, restricting explicit software to users over the age of 18.

Public submissions closed on 19 July and Ron Robinson from the Chief censor's office says that disappointingly few submissions were received. "Unfortunately however, that is the pattern, people wait until something has been decided, and then react against it."

The Chief censor's findings on the issue will be delivered in a report to the State and Federal Attorneys General in October.

The whole issue of censorship and classification is close to the heart of AITS vice-president Jonar Nadar, who has instigated a classic debate on the issue to be held on September 9. Based on the dual rights of the population to protection from pornographic material and freedom of information, the debate will feature Rev. Fred Nile, MLC, on one side, and Robert Swan from the Eros Foundation on the other.

"Censorship is a dual-edged sword," said Nadar. "Once you give Big Brother the right to control the things you want him to control, you may wake up and find he's controlling other things as well. On the other side of the argument, classifying software is a sure way of making it a bestseller. Banning is so regressive, and it patently doesn't work, anyway. It is much wiser to teach than to ban."

To attend the breakfast debate, contact the AITS on (02) 901 3644.

**Helen Dancer**

## Narcotics unit busts up Silicon Valley computer-funded project

What started out as a good-will effort by Silicon Valley computer companies, ended up with mud on their faces. Mud from the Homeless Garden Project in Santa Cruz, California, that is, after the town's police raided the community-funded garden and dug up their flower boxes.

Santa Cruz Operations, the Packard Foundation and other local organisations thought their funding was simply aiding the homeless who help man the oceanfront garden.

Instead, participants found they were a party to the illegal growing and harvesting of papaver somniferum, better known as opium poppies — the source of the drug opium — and suddenly under investigation by local authorities.

"I wish you could have seen the expression on the face of the garden director when the narcotics unit came," said Zee Zabollos, spokeswoman for Santa Cruz Operations, who also volunteers company time to work with the project.

A passer-by reported the poppies to the police, who then investigated the garden's practice with the flower. After discovering the flowers were harvested, the bright orange blooms were ripped out of their flower beds and an investigation began.

The project's directors confessed they harvested the flowers, but only in order to make dried flower wreaths, a process which requires that the poppies' pulp be extracted — an illegal act in California. The investigation turned up innocent intentions by the 15 gardeners of the 2.5 acre plot, and it was decided that the plants were being grown for strictly ornamental purposes.

"Then we received a list of no-no plants by officials, so now we don't grow the poppies any more," Zabollos said. **Charlotte Dunlap**  
**Edittech International**

## Supervision or surveillance?

Networked employees are now being closely watched by their bosses. Software programs that enable spying are becoming more and more common in offices around the US.

However, the capabilities of these 'spying' programs have been the focus of major debates over how these tools are being used . . . to supervise or survey workers.

According to several studies conducted in the US, between 10 and 15 million employees are being 'spied on' each year — and that number is rising. Currently there is an act before the US Congress that would require employers to notify workers that they are being watched. Other US privacy groups are lobbying state law makers to make it mandatory that companies alert workers to monitoring.

While the legality of the surveillance is still under debate, US software developers are forging ahead in this niche market that saw sales top \$US175 last year — growing at a rate of more than 50 per cent a year — with products that cover all ends of the computing spectrum from the standalone PC, to LANs, to high-end systems.

Surveillance software programs enable system administrators and bosses to monitor the number of keystrokes per minute, the length of time a worker takes a break, or what files were opened and for how long, and even read email messages.

"Just like almost anything, if someone wants to use the products for the something other than supervision, it can be done," said Emerick Woods, vice-president and general manager of the client/server technical group at Microcom — which makes a monitoring program called LANlord. "But most times, system administrators do not have the time to look into every employee's desktop to see if they are writing their resume on a company computer or during company time."



At the desktop and LAN level, PC Sentry, which was developed by Solid Oak Software in California, US, maintains a daily log of all files opened, deleted, created, copied, directories created and deleted, time changes, and commands issued for the DOS prompt. It also keeps records of the number of keystrokes per minute and periods of keyboard inactivity. And the program can be 'quietly' logged on so that workers never know they are being monitored.

LANlord Version 2 is marketed as a centralised management tool for the DOS and Windows markets on LANs. A client/server-based system, LANlord 'pro-actively' manages remote PCs and LAN across multiple locations. According to Woods, the concept behind LANlord is that system administrators are able to monitor the hardware and software usage of a worker's PC without having to leave his or her office.

However, LANlord used in conjunction with an integrated remote control-based version of Microcom's Carbon Copy — a software package that can duplicate what appears on a worker's PC screen, gives employers the ability to drop into a worker's PC — without warning — and see exactly what the employee is working on in real time.

While these monitoring packages are receiving the most attention for their monitoring abilities, bosses can also eavesdrop on employees' email messages without any additional software. For example, every time a cc:Mail user sends a message, the message is posted in a centralised 'post office' that logs when and where the message was sent. In fact, those email messages can even be recalled and played back by a systems administrator.

The argument against monitoring has been gathering strength in recent months. In June, the Communications Workers of America released a study it had just completed in conjunction with the

University of Wisconsin. It concluded that workers who are monitored suffer from much higher degrees of stress and anxiety than non-monitored workers. Of those surveyed, 81 per cent said they suffered from a high degree of depression, and 72 per cent said they suffered from extreme anxiety.

"Workers deserve to feel that their privacy is protected in the workplace and that big brother is not watching at all times," said R.J. Heffernan, president of Heffernan and Associates, a consulting firm based in the US that specialises in the safeguarding of information.

**Mike Moeller**  
**Edittech International**

## New image for Dell

Gone is the killer advertising campaign characterised by slogans such as 'War Is Dell' — the new Dell will focus on a softer, more corporate approach. "That was just for starters," marketing manager, Denis Rowe, told *APC*. "Dell doesn't tiptoe into any market, and we have certainly made our impact, both in the advertising campaign and our pricing structure. Dell has initiated further price declines across a whole range of brands in this country, and we intend to keep it up."

Customer service, rather than head-to-head unit comparisons with other companies is Dell's focus, according to Rowe. "It's not really of interest to the customers to know who sold more than whom, so why should it be relevant to us? What we can say is that of all the people who have bought Dell computers, not one has been a dissatisfied customer. We're winning people over on price, and on sheer value in service — who else among our competitors can say that?"

The new campaign, and Dell's new image will be targeted much more at the corporate level, losing the gung-ho bargain-basement approach it adopted for its entry into the market.



Microsoft's three previous MDs. Jackson's departure marks the third in under three years

Rowe dismissed reports that the company had not performed to expectations, asserting that it was still on track to achieve two per cent of Australian market share by the end of the year, and he further predicted that the company would reach 20 per cent by the end of 1996.

"We have a worldwide policy to provide better machines with better service at better prices. Why do you go to McDonalds? Because you know exactly what you're going to get, it's readily available and it comes at a price which makes it accessible to everyone. That's the model."

**Helen Dancer**

## Microsoft loses managing director

Microsoft Australia has announced the resignation of Gary Jackson as its managing director. The move follows speculation about the status of legal proceedings between Jackson and his former employer, Pyramid, over golf sponsorships that Jackson undertook on the company's behalf. A statement which accompanied Jackson's departure quoted the former managing director as saying that he did not want the speculation to affect Microsoft, and that he had chosen this time to make a clean break. Jackson was not available for comment on this issue or his future plans.

Regional human resources manager for Microsoft, Mike Camizales, now has the weighty responsibility of finding a replacement, an appointment which he says will be made without delay. "The usual timeframe for such a strategic appointment is 60 to

90 days, and we will be looking both inside the company and beyond, locally and overseas. Microsoft gives preference to locals in such appointments," he said.

The decision closely follows Microsoft corporate office's decision to return to Australia former Australian managing director, Daniel Petre, to head up a significant software development and export programme. Petre is expected back in Australia soon.

**Helen Dancer**

## FTC deadlocks over Microsoft

The US Federal Trade Commission has all but given up a three-year-old anti-trust investigation into Microsoft's \$US7 billion empire.

Last week, the FTC deadlocked in a two vs. two vote over whether to pursue the complaints recommended by the FTC investigators and institute an injunction against Microsoft. Microsoft officials were "extremely pleased with the outcome," adding, "... it has never been a part of any anti-competitive behaviour."

Nonetheless, the US government may not be done with Microsoft yet. One US senator said he will push the US Justice Department to take up the investigation.

The main reaction to the FTC decision from the companies, such as Novell, that urged the FTC to investigate Microsoft was discouragement. The outcome is "... very disappointing," according to Novell general counsel, David Bradford. Novell and the other companies involved in the case hoped the FTC



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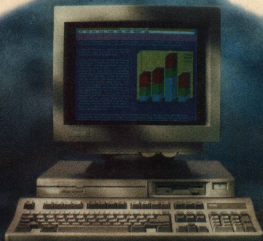
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would provide guidance as to what constituted an "abuse of mono-poly power in the industry."

Two main areas of that were considered by the FTC were for its licensing and incompatibility practices. In terms of licensing, the charges centred around how the software kingpin sells its MS-DOS operating system to PC vendors. The company offers PC makers a variety of ways to buy the MS-DOS operating system, but the one that caught the FTC's eye is a licence that grants discounts of up to 60 per cent to computer makers who pay for a copy of DOS for every PC they ship — whether or not the PC comes with the program. Many vendors opt for this arrangement, which Microsoft calls 'per processor' licensing, because of the huge discount.

The charges surrounding the alleged incompatibility involve the lack of ability of Microsoft's Windows 3.1 user interface to run on non-MS-DOS operating systems. Novell claims that early copies of the GUI sent to testers early in 1993 were rigged to display an error message if used with an operating systems other than Microsoft's own MS-DOS. Novell claims that this was designed to discredit other operating systems such as Novell's DR DOS. The deadlock FTC vote came when one of the commissioners, Roscoe Starek, withdrew himself from the voting because of family stock options held in Microsoft. This is the second time that a vote regarding taking action against Microsoft has ended in a deadlock. In February, the FTC also voted two vs. two in the Microsoft case, but granted a six-month extension to allow investigators to continue researching Microsoft.

While the vote does not end the investigation, it is now in the hands of the US Justice Department to pursue or for individual companies to file lawsuit.

**Mike Moeller**  
**Édittech International**

## Microsoft blasts Novell over FTC

A tongue lashing by Bill Gates aimed at Novell has the networking company's execs shaking their heads in disgust. In the war of words, Bill Gates has lashed out against Novell for prodding federal investigations against Microsoft, claiming Novell has ulterior motives to boost its own PC software sales.

At a meeting with financial analysts and reporters last month, Microsoft chairman Gates said Novell has recently stirred up a now all-but-dead federal anti-trust investigation of Microsoft, aiming to prop up sales of its own DR DOS clone of Microsoft's MS-DOS PC software. Gates added that the company did nothing wrong, but that Novell was determined to push for action so it could force Microsoft to raise its prices, stop innovating and open a market for a competing operating system.

But Novell executives contacted the next morning only expressed annoyance over Gates' comments, saying he was, "way off base." "I'm trying to figure out how the guy thinks that competition is hindering technology and raising the price of their products," said David Bradford, senior vice-president and general counsel for Novell. He added that it is not a Novell issue, but an industry issue.

"Ray (Noorda) told me the other day that he did a quick calculation and has figured that since DR DOS has been on the market (since 1988), consumers have benefited by saving one-half US billion dollars (due to competing offerings)," he added.

The comments by Gates on the Federal Trade Commission (FTC) came just a week after the agency deadlocked two vs. two on adopting the recommendations of FTC investigators to act against Microsoft for allegedly unfair business practices. "After three-plus years of investigating everything Microsoft has done, there has been nothing that has come up (in the FTC investigation) that causes us the slightest concern," Gates said. "The only issues that come up today are issues heavily pushed by Novell so they can sell their clone product, DR DOS."

Novell's Bradford said its initial involvement with the FTC investigation happened well before the existence of DR DOS, so it did not have any hidden agenda.

Also included in the wide-ranging comments, Gates vowed that Microsoft would be a force in developing and profiting from the coming 'data superhighway', demonstrating software that would appear to put Microsoft in direct competition with Apple in that future market. Gates further warned that analysts not expect the company's sharp revenue and profit increases to continue in fiscal 1994.

**Charlotte Dunlap**  
**Édittech International**

## Yanks afraid of technology

One in four Americans are not only frightened of computers, but they have never even touched one, according to a recent report by Dell Computer.

Fear of technology is seen as the phobia of the '90s in the US, and although the survey was conducted in the States, Dell officials said technophobia is likely to be worse internationally where computer use is less prevalent.

Among survey findings, one quarter of US adults have never used a computer (or 27 per cent), set a VCR to record a television show, or

programmed favourite stations on their car radio.

One-thousand adults and 500 teens across the country participated in the survey. The survey is part of a broader 10-year study conducted by Dell to look at what it calls 'technoknowledge' in America, aiming to reach a greater understanding of user needs and strengthen marketing strategy, officials said.

"The survey results mean we in the computer industry are not doing the best job in making technology accessible to people who would use it," said Dell spokesman, Roger Rydell. He added that in international markets, "where people are not quite so com-

puter-savvy," results would probably reflect even greater technology fears.

The survey had teens receiving the highest marks for being technology-savvy, with 92 per cent of the younger set more comfortable using a variety of technology devices, compared with 74 per cent of adults.

Computers produced the most anxiety among adults, with 23 per cent saying they were not comfortable using a computer on their own.

Thirty-two per cent of the adults were intimidated by computers and worried about damaging the machine if they used it without assistance. Of that group, 22 per cent were uncomfortable setting a digital alarm clock, the survey revealed.

Teenagers, on the other hand, were more comfortable using a computer than an answering machine. A whopping 91 per cent of American teens said they were comfortable using a computer.

Other survey findings disclosed that women are more inclined to suffer from technophobia than men — 55 per cent vs. 45 per cent — with technophobia showing up in the survey's respondents overall. Similarly, the majority, or 51 per cent, of all adults find new technology difficult to understand and the rapid rate of change in technology confusing (58 per cent). "Further, one-fourth of adults 'miss the days when we just had typewriters.'"

Dell's Rydell said the company is using the survey information to better market its machines, as well as to better design future computers.

"We as a company need to broaden the categories of the customers we're selling to," he said, adding that appropriate customer-support services could then be assigned to different technology-educated levels of customers. He added that the key message to the industry coming from the survey is that it needs to rid the market of proprietary offerings.

**Charlotte Dunlap**  
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## SYSTEMS

# IBM announces a 'better' DOS than MS-DOS

Compatibility used to be the name of the game. In past releases of their respective versions of DOS, IBM and Microsoft consistently released products that were almost identical to each other. Those days of product uniformity have apparently ended with IBM's announcement of PC-DOS 6.1, which was expected to ship at the end of July.

The new game is MBD (More, Better, Different) marketing, and IBM has come out swinging. IBM says PC-DOS 6.1 is smaller and faster than MS-DOS 6.0. The company demonstrated speed improvements in video updates, batch processing, and the execution of ANSI commands. UMB (upper memory block) support was improved to decrease DOS's memory requirements by using extra video memory as UMBs and adding UMB support for 286-based systems.

The major area of product differentiation is in the included utility programs. IBM responded to Microsoft's DoubleSpace disk compression by announcing that Addstor's SuperStor disk doubler will be bundled this October. Early purchasers of PC-DOS 6.1 will receive a coupon they can use to upgrade at no cost when the SuperStor version is released. This new version will provide full support for the Microsoft Real-Time Compression Interface.

Central Point Software's Backup program supports archival storage on floppy disk,



minitape or SCSI tape. This program is augmented by RAMBoost, a memory optimiser, Undelete, and Scheduler, a program that can run Backup unattended at periodic intervals.

The included AntiVirus program is a product of IBM's own Thomas Watson Research Center. It's claimed to detect and correct over 1400 viruses. Fuzzy-logic technology is used to find mutating strains of known viruses.

**Matt Trask**

## Industry uses virtual reality

London — Twelve firms have formed an initiative with one of Europe's leading virtual-reality research centres to apply computer-based simulation and advanced visualisation in complex industrial design and 3D-modelling projects. Under the VRS (Virtual Reality and Simulation) in-

itiative, major industrial firms such as Rolls Royce, Nirex, Vickers Shipbuilding and Engineering, ICI Chemicals and Polymers, and British Nuclear Fuels, will pool their engineering talents with the Salford-based Advanced Robotics research (ARR) centre at several levels.

Movies like *The Lawnmower Man* have glamorised the more advanced aspects of virtual reality, where subjects don special helmets and gloves to enter exotic and futuristic worlds. However, the companies participating in the VRS initiative will use virtual reality in nuts-and-bolts projects ranging from environmental impact studies to 3D walk-through models of nuclear and diesel submarines. The first three projects should achieve tangible results within the next 18 months, says Bob Stone, who is ARR's technical manager.

The three projects are a

300-acre mine model for Nirex, an engine simulation for Rolls Royce, and a submarine compartment program for Vickers. ARR is providing consultancy to help Nirex benchmark and convert data about the mine, based at Sellafield, into virtual-reality models. ARR will use Nirex AutoCAD files to create a surface model of the mine and then develop further models for sections underground. The hardware for the Nirex project has yet to be chosen, although the two likely candidates are Silicon Graphics platforms and the high-end 3D graphics Freedom workstation sold by Sun Microsystems and Evans & Sutherland.

ARR will also be helping Rolls Royce develop a model of its Trent 800 aero engine's fan casing and other features. The ARR contract with Vickers will eventually result in models to test new submarine designs.

**Dom Pancucci**

## Windows outsells DOS

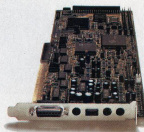
In the first three months of this year, sales of Windows-based applications surpassed sales of DOS-based applications in North America, according to the Software Publishers Association, a trade association of the PC software industry. The association reports that the Windows sales growth was fuelled by the 112 per cent increase in the sales of Windows databases over the previous quarter, a sales growth driven primarily by the success of

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Borland's Paradox for Windows and Microsoft's Access. The popularity of Windows databases no doubt contributed to Lotus Development's acquisition of Approach database for Windows.

In all four of the major business-oriented categories (that is, word processing, spreadsheets, databases and presentation graphics), Windows programs outsold DOS applications. DOS continued to hold the lead in home education, finance and utilities. In the area of entertainment, DOS whopped Windows by generating \$US60.1 million in sales, compared to \$US3.1 million for Windows.



**Windows 3.1** — driving the uptake of Windows applications which in the US now outsell DOS software packages

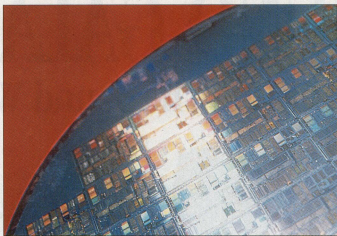
Trends in Europe were similar to North America's in the first quarter of this year, according to SPA Europe. Revenues generated by Windows products accounted for 70 per cent (\$US338.1 million) of the 41 software firms participating in the SPA's data program.

**Dennis Allen**

## DEC Alpha goes mobile

DEC's Alpha chip is not just for high-end systems. Last week, Digital Equipment began development on low-powered PCI-based Alpha CPUs designed for handheld computers and notebooks. The new processors are set to be rolled out next year.

The processors will use between two and three watts in portable systems with a PCI interface and memory onboard,



**Keeping the Pentium cool** — PC manufacturers are adopting different solutions

according to Ed Caldwell, vice-president of semiconductor operations. As well as used internally, DEC will sell the processors to outside interests.

The Alpha-based systems will be focused on handwriting and voice recognition as well as capabilities for video, voice and data transmission, Caldwell said.

The creation of the processor will take place at the soon-to-be-opened Alpha AXP Microprocessor Design Center in Palo Alto, California as well as a satellite centre in Austin, Texas.

The Design Center in California will pioneer the company's efforts for the design and development of low-power, low-cost Alpha AXP microprocessors and systems for the mobile and wireless computing markets. Digital is aiming to forge alliances with industry leaders in mobile computing.

Caldwell is optimistic about this announcement because it's a new market area for the company. DEC aims to serve all bands of the market from portable systems to high-end servers with the scalable Alpha AXP architecture, Caldwell said.

"By joining the microprocessor and system design efforts and forming alliances with key players in the mobile market, Digital will be able to deliver the performance of the Alpha AXP ar-

chitecture at high volume, mobile market prices," Caldwell said.

**Ann Steffora**  
**Edittech International**

## Pentium chills out

In an effort to cool off fears that the Pentium microprocessor chip runs too hot, several vendors have developed 'heat sinks' to keep the chip from burning up. Industry experts say heat sinks are more reliable than old-fashioned fans.

Choosing the right solution for keeping the Pentium cool may not be as easy as it once was for systems based on other CPUs, especially with today's crowded printed circuit boards.

The heat sink manufacturers say they have the parts that will keep the Pentium from overheating. The challenge they confront is designing a cost-effective solution which will pull off enough heat to keep the chip in its operating range.

Two main aspects companies must keep in mind in designing a heat sink are space and power.

In some cases, vendors need to cool other components as well as the processor, and usually rely on air from small fans. If there simply is not enough room for a fan in the housing, a heat sink is the only choice. Sometimes the space is only 0.465 inches,

and the smallest fan currently manufactured measures 0.650 inches. As well, most vendors support heat sinks above fans, because fans are believed to not be reliable enough as there is no feedback mechanism to let the user know if the fan has failed.

One example of their efforts is Aavid Engineering. Aavid's product line includes different models of heat sinks that adapt to limited airflow, a pin fin series which radiates heat without active cooling, as well as box anchor and piggyback devices that can be stacked. The latter allow computer makers to base configurations on how much airflow is available.

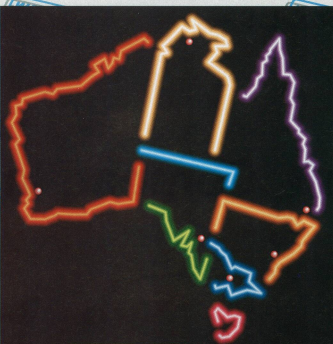
EG&G Wakefield Engineering's 698-series Penguin pin fin works much like Aavid's pin fin series. EG&G's products maximise heat dissipation with solutions using socket clips which the company says are the most effective method available for system designers. Since microprocessors are not completely flat, adhesive tape, epoxy glue or a metal clip must be used to fill any gap between the top of the processor and the bottom of the heat sink.

There are more reliable ways (at higher costs), including those which smooth the base of the heat sink to fit closer to the Pentium.

Vemaline Products chose this route for its Heat Away HTSS50 — a round, grooved aluminum-alloy heat sink that screws into a plastic connector which is then attached to the Pentium. The company felt that clips do not let heat sinks sit flat enough on chip so it opted for the machined-bottom.

Heat sinks will keep Pentium's temperature within the operating range that Intel specifies, which goes beyond the 486 device's 32 degrees to 185 degrees Fahrenheit range. However, some customers, like IBM, still want the added protection of a fan, a Vemaline spokesperson said.

**Ann Steffora**  
**Edittech International**



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## PERIPHERALS

# Microsoft, Compaq talking

**M**icrosoft and Compaq are working with speech compression specialist DSP

Group to bring new voice technology to computers running Windows. DSP's TrueSpeech proprietary algorithms can compress a one-minute voice file down to 60K with no noticeable degradation.

The three companies believe that with the addition of a low-cost, efficient voice compression standard the number of voice-enabled business computing applications will be enhanced. These include voice-annotated business documents, voice-annotated email, voice-supported presentations and voice-annotated databases.

DSP, for its part, believes that the ability to record, store, distribute and play back voice will become standard on every personal computer in the near future. Microsoft and Compaq in fact expect to use TrueSpeech in various products and technologies later this year.

"TrueSpeech technology, we think, will sour additional voice capabilities and speed adoption and use of audio over local and wide area networks," said Compaq director of desktop marketing in the US, Andrew Watson.

US-based DSP pioneered the all-digital telephone answering machine and its chipsets are used in products from such household names as Sony, Panasonic Siemens and Northwestern Bell.



The company's TrueSpeech algorithms convert 'bursts of air', that is 'words' into digital numbers.

"TrueSpeech is based on complex mathematical algorithms derived from the way air from the lungs is shaped by the throat, mouth and tongue when we speak," said DSP president Eli Porat.

DSP claims its technology is 20 times more efficient than others on the market.

It is DSP's ability to compress sound files that has attracted Microsoft and Compaq. The companies — together with Apple — offer audio, but what was missing was the ability to compress these voice files so that large files can be stored and forwarded without using up large amounts of disk storage or network capacity.

**John Sterlicchi**  
*Editech International*

## A unified ink standard

Digital ink, the most useful data type for mobile applications, is ironically one of the least portable data types for sharing information between machines, operating systems and applications. Effectively sharing ink requires more than a common bitmap; unfortunately, a sharable ink data format that captures stroke order and other key attributes of ink hasn't emerged.

Six heavyweights in the mobile and pen-computing arena — Slate, Apple, General Magic, Go Corp, Lotus and Microsoft — are currently developing what they hope will be a long-term solution to the problem of sharable ink. Jot 1.0, the result of collaboration between these six players and a few others, is a specification for a standard,

comprehensive ink format that each company has pledged to support.

Jot is a platform-independent format definition for captured ink. It includes properties like timing, pressure, stylus angle, and bounding coordinates, plus more esoteric attributes like colour and type of nib. Software using Jot can choose only the properties it requires and ignore non-essential information. Jot is designed to be complete and extensible as other required qualities of ink are uncovered.

Captured ink stored in Jot format maintains all the attributes of 'fresh' ink. As a result, it can be scaled, fed to recognisers that required information about how the ink was created, and processed by systems that don't include a stylus. Jot-format ink can be stored in shared databases, processed offline, or incorporated into keyboard-oriented applications. Because storing the information required by Jot can consume a lot of space, Jot includes an optional provision for compression and stroke information reductions. Slate's Dan Bricklin said Jot would likely be an interchange format only, and most ink-based applications would continue to use smaller custom data formats internally.

Slate plans to incorporate Jot into PenApps: General Magic will include Jot in Telescript; Microsoft offered a long-term goal of rendering ink on every Windows desktop, and it will provide



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"... the TrackPoint was very much to our liking. We found it easy to use and perfectly placed for both right and left handed users."

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"The product is extremely low priced for active matrix colour compared to the competition."

*The Australian*

"The ThinkPad proved to be an above average performer, and the colour display is one of the nicest we've seen...both in size and colour quality."

*Australian PC World*

"The keyboard is outstanding."

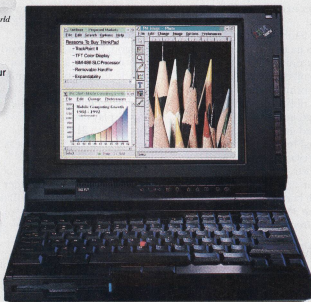
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an OLE object with Windows for Pen Computing that will support Jot; and Go announced the integration of Jot into the next release of Pen-Point, scheduled for late this year.

Lotus and Apple will also support Jot-format Ink, but Apple's Rick Spitz noted that Jot will not be built into the initial release of the Newton. Brian Dougherty, chairman and CEO of GeoWorks, said that his company is currently evaluating the Jot 1.0 specification and will likely support it in the next release of GEOS. "The only reason we wouldn't support it would be if we saw some performance problem with it," Dougherty said.

Jot offers a great deal of promise, not hindered by its solid support among ink-software vendors. But its timing may be the real key. Microsoft's Pradeep Singh praised the definition of the format "at the outset of the data type." Jot has its best chance for universal acceptance now, before the mobile/pen industry is well off the ground.

**Steve Apiki**

## Group battles HP

A group of thermal colour printer technology vendors have banded together to challenge Hewlett-Packard's domination of the printer market.

The new consortium, called the Association of Color Thermal Transfer Technology (ACTT), based in Buffalo, New York State, has a mission to educate resellers about the technology and applications that are best suited for colour thermal technology.

Unlike laser or inkjet printers, thermal printers are designed only for high-quality colour outputs for such fields as medical imaging, government imaging, or for business presentations. The printers use a wax ribbon that contains a variety of different colours that are only used when told to by a computer.

"Right now we are in our infancy and need to walk before we can run," said Jonathan Bloom, a spokesperson for ACTT. "First we are going to educate US resellers about the technology and the benefits of using colour thermal printers for specific applications. But if all goes as planned by next year, we hope to be able to educate resellers in other parts of the world about the technology."

Bloom stressed the importance of education at the reseller level because, "right now many people have no idea what the printers do or the technology and the reseller needs to be able to point out to the users when a colour thermal printer is appropriate. But they can only do that if they themselves understand the technology."

According to a study commissioned by ACTT, worldwide there totals over 1.5 million inkjet and colour thermal printers on the market right now — 1.3 million are inkjet printers and are 169,000 colour thermal printers. Despite being numerically inferior, colour thermal printers account for 40 per cent of all colour outputs and inkjets account for 60 per cent. HP currently holds 90 per cent of the inkjet market, according to IDC.

Members of the consortium include CalComp and Tectronix — both US manufacturers of colour thermal printers; three colour thermal ribbon makers — Armor, based in France, Fujioclan, based in Tokyo, and International Imaging Materials; and two plastics suppliers to the industry, Diafol, based in Japan and Mitsui Plastics, both based in the US.

**Mike Moeller**  
**Edittech International**

## IBM launches monitor business

After more than 20 years of making monitors only for itself, IBM has scrapped the practice and formed a new business unit to manufacture

## Compaq modems on the move

Generally number two or three on the list of complaints of notebook computer users in Australia (after battery life or weight) is the lack of high speed internal modems for most popularly-available brands.

While there are any number of reasonable quality external modems meeting Austel approval, internal notebook modems have remained proprietary, and as notebook vendors have not been prepared to undergo the cost or hassle of gaining Austel approval for the relatively small numbers involved, users have had to go without.

Compaq, however, has blessed users of its LTE Lite, Contura and LTE 386s/20 and Portable 486 families with a new MNP 10 internal modem, the SpeedPAQ 144 Modem.

The SpeedPAQ supports MNP 2-4, MNP 10 and V.42 data correction, and MNP 5 and V.42bis data compression protocols. This makes it the first internal notebook modem to offer MNP 10, which is a self-correcting and configuring correction protocol ideal for landline or cellular connections.

The modem also supports Compaq's power conservation techniques, Hayes AutoSync for direct serial connections to mainframes, and customer travel to North America, the UK, France and Germany using Direct Access Arrangements. It has Class 1 fax capability to 9600bps, and is bundled with Delrina Windows and DOS fax software.

The modem has been fully Austel approved, although its Cellular feature, Cellular Direct Connection, which uses a simple cable, has not yet been Austel approved.

For further details contact Compaq on (02) 911 1999.

**Jeremy White**

displays that will work with all computers, including Macintoshes.

The move comes only days after IBM lost more than \$US8 billion in the second quarter and CEO Louis Gerstner said Big Blue would make moves to improve competitiveness.

Along with the formation of the new business unit, called the Visual Products Division, IBM also introduced a whole line of displays that include such features as built-in audio capabilities and touch-screen functions. The new displays range in size from 14in to 21in.

"This is a serious business that we are going to attack and make money in," said Joe Formichelli, general manager of Visual Products for the IBM PC Company. "Of course, we are going to pay close attention to what our people are doing down the hall, but we are also going to cater to all of the systems out on the market."

The new monitors comply with the MPR-II emission standards guidelines and also meet the US' Environmental

Protection Agency's Energy Star program. All of the monitors also have the touch-screen capability. The monitors use capacitive-overlay technology to provide fingertip control.

Users also can buy integrated audio capabilities as well. The new audio system, called MM-1, allows users to listen to or record documents. The system comes with speakers, an amplifier, and a built-in microphone. The MM-1 is stored in a single module that sits underneath the monitor.

"IBM will be fairly successful in the monitor business if it focuses its attention on making sure that all IBM PCs and computers use only IBM monitors... something that is not done right now," said Jack Roberts, an analyst with Dataquest. "If it thinks that it is going to be a major success outside its own business, then it will have a hard time meeting expectations."

Formichelli said IBM is expecting to ship over two million monitors this year.

**Mike Moeller**  
**Edittech International**

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## Business-card scanning on the road

Pacific Crest Technologies in the US will release later this year a business-card scanner that will compete in the same category as CypherTech's and Microtek's business-card scanner. It will be about the size of a portable cassette player and will connect to your desktop or notebook PC through the parallel port. It will weigh less than a pound without the AC power adaptor.

Rich Sondheimer, president of the company, said the business-card scanner's small size and parallel-port connectivity make it an ideal solution for portable computers.

"We're targeting it for professionals and salespeople who don't want to have to open their computer or laptop to install a new product," he said.



The hardware/software unit will include Windows-based software that automatically identifies names, titles, company addresses, and other information and put it in the proper fields in the included standalone database. The program will offer the ability to import and export data from Paradox, dBASE, Lotus 1-2-3, PackRat, Act!, Organizer, Ascend, and Franklin. It will also have a universal import/export function that lets you create your own import or export format for any Windows or DOS-based address database. Pricing on the system isn't finalized.

**Dennis Allen**

## Scanners turn business cards into database records

If your desk is piled with stacks of business cards and you dread the prospect of laboriously entering all those names into a database, technology has come to the rescue. A pair of new products, released in the US, will let you scan business cards, convert their images to text, and pump the names, titles, addresses, phone numbers into appropriate database fields.

The first of these nifty gadgets is the Scan-in-Dex from Microtek, which consists of a small scanner (6.4 by 5.8 by 2in) designed specifically for reading business cards and a Windows software package that performs OCR, extracts the data, and puts it into a proprietary database. Scan-in-Dex is being sold as an integrated one-button solution that is easy enough for any user.

A more recent arrival is the CypherScan family from CypherTech, consisting of two software-only products. The first is for users with a flatbed or hand scanner. The other product includes the same diminutive card scanner as the Scan-in-Dex. The flatbed version includes a card-holder template that lets you read in up to eight cards in a single swipe. The software runs in Windows.

Both companies use AI to parse out the name-and-address information and assign it to the proper fields. Microtek's OCR software (licensed from Ocron) routes the converted text to a rules engine that searches for keywords and character patterns. Thus, if a line of text includes the words Street or Avenue, the software assumes this is the address. Job titles are identified through a lookup table of likely candidates (for example, president).

## NetComm rockets to MNP 10

NetComm claims it's working to correct perceived reliability problems affecting its and other manufacturer's modems on two fronts: software configuration utilities and drivers for popular applications, and a push to popularize MNP10 as a de facto standard.

NetComm is currently working on MNP10 modems, which at least at the high-end between two MNP10-capable modems, should solve problems with line drop-outs, deteriorating line quality, and the simple infatuation of forcing two modems with different configurations to connect.

Currently there is no simple way for two modems to 'chat' when initially connecting to determine each other's capabilities. One modem dials another. If the answering modem can't handle the speed at which it has attempted to connect, it will step back to a slower speed until they connect. Compression and correction are almost entirely dependent on user specification via initialization strings.

MNP10 will attempt to correct this. When two MNP10 modems connect, several steps comprise the initial sequence of the connection. The two modems will determine whether they are both MNP10. They will then determine the highest connect speed capable for the quality of the line, and the correction and compression modes to be used.

Once the two have connected, the modems will dynamically monitor the quality of the line. If the signal to noise ratio deteriorates, or there are an unacceptable number of errors, the two modems will negotiate to drop back a connect speed level. If transmission is operating perfectly on a lower speed, the two modems will dynamically shift up a level after agreeing.

This means that two MNP10 modems will not only connect without the user having to fiddle with settings for the line quality their subject to, but that transmissions become far more robust.

A standard telecom line has a signal to noise ratio of about 30, the poorest quality line Telecom accepts is 20, which is audibly poor. Two MNP10 modems will happily communicate at 14.4K down to around 15, and even with a ratio of 5, a 1200 baud modem can still maintain a transmission.

Whereas with most modems a deteriorating line would cause your 14.4K connection to be lost, with MNP10, the connection will be maintained, albeit at a slower rate, and if the line improves, speed will increase to match.

MNP10 is still under development, and it will be the end of this year or early next year before the first MNP10 modems come to market. Even then, the technology is backward compatible, but not backward functioning. In other words, while MNP10 modems will connect to older modems, you won't gain any of the functionality the standard offers unless you're connecting to another MNP10 modem.

**Jeremy White**

CypherTech's technology, built on the Calera OCR engine, is more sophisticated, using a combination of positioning, relative font sizes, word lookups, and other rules to determine where text should go. Thus, it might be able to successfully identify an odd job title because it is located on the line between the name and the address. However, both companies' products can be fooled by unusual business-card designs. To facilitate fixes, both put text that can't be placed into a

'comments' box. Both packages include a simple database that stores card data, but CypherScan offers more flexibility: records can be stored natively in dBASE or Paradox formats or exported directly into Lotus Organizer or Contact Software's Act!. Scan-in-Dex exports only ASCII. CypherScan also recognizes email addresses. Both companies plan Mac versions, but neither company has announced expected Mac shipping dates.  
**Andy Reinhardt**

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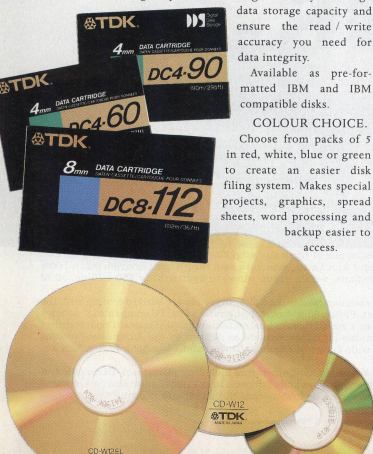
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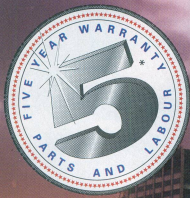
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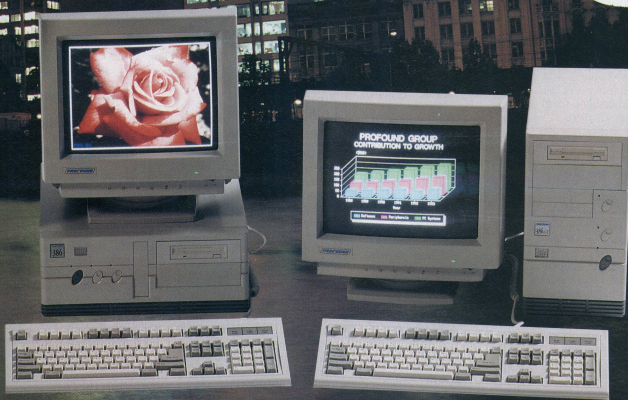
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## SOFTWARE

# Microsoft readies Office 4.0

An upcoming version of Microsoft Office is expected to give users even more application integration by using common user interface, query and intelligent help features.

Microsoft Office 4.0 will include spreadsheet Excel 5.0, word processor Word 6.0, and some have speculated that an updated version of PowerPoint will be included. Current versions of Access and MS-Mail will be enclosed as well.

Significant features of the package will highlight: smart help technology, called 'IntelliSense', that runs across all Office applications using a Tip Wizard to follow the user's movements and suggest shortcuts to tasks; Cue Cards, a usage of context-sensitive help which gives automated demonstrations on how to complete tasks; support for OLE 2.0 in several of the applications; and VBA integrated in Excel 5.0, which gives users the capability to automate functions in other OLE 2.0-enabled programs.

Microsoft will attempt to synchronise application releases with those of Office, according to Mike Maples, executive vice-president for worldwide products. And even though not all of the applications in Office 4.0 will be updated for the release, users are entitled to the next version of the application at no cost.

Office is a key component of Microsoft's 'solutions' strategy because the applications can be customised with Visual Basic for Applications (VBA) and Object Linking and Embedding (OLE) 2.0.

According to US-based InfoCorp, Office yielded about half

of Microsoft's \$US2.2 billion in applications revenue in fiscal 1993. InfoCorp estimates that Microsoft has about 80 per cent of the office suite software market, but Lotus Development's SmartSuite is gaining popularity. The unofficial word is that Office 4.0 will ship by November.

**Ann Steffora**  
*Edittech International*

## Odessey releases ISYS for Pen systems

Australian software developer Odyssey Development has released its first text-retrieval software package for pen systems. ISYS for Pen — which the company demonstrated at Comdex Spring in May along with ISYS for Windows and ISYS for DOS — runs under the Microsoft Windows for Pen platform. ISYS for Pen has the same feature-set as ISYS for Windows, but sports its own pen-centric interface.

Odyssey Development managing director Mark Reiss said that although the market and technology behind pen systems is still in its infancy, Odyssey hopes its text-retrieval package for pen systems will give the company an early lead in the market.

According to Reiss, ISYS is ideal for the pen platform. "Applications such as word

processing or spreadsheets are inappropriate for the pen platform at this stage in development because the packages are primarily input-oriented. Pen computers are better suited to low-volume input applications such as text-retrieval products, which require only small amounts of input and are primarily output-oriented applications," he said.

A standalone version of the ISYS for Pen costs \$525. Contact Odyssey Development on (02) 965 7250.

**Maryanne Phillips**

## Lotus Organizer group scheduling

The latest release of Lotus Development's personal information manager (PIM) for Windows called Organizer, released August 10, has new capabilities for supporting group scheduling needs.

Organizer 1.1 is aimed to solve the group scheduling needs of Lotus cc:Mail for Windows users.

Lotus says its Organizer 1.1 is a message-reliant, Vendor Independent Messaging (VIM)-compliant scheduling application which allows users in different groups, departments or locations to perform realtime searches of other Organizer users' free time, so schedule conflicts can be eliminated, unlike competing products that only update on a periodic basis.

The program can be used with an existing cc:Mail network to deliver meeting messages to users over LANs or WANs. The functionality to perform automatic scheduling and booking of meetings in Organizer calendars is integrated. Users not using Or-



ganizer would receive meeting invitations as regular cc:Mail messages. Meeting invitations can be sent to users on alternate mail systems via cc:Mail gateways.

Organizer takes advantage of all of the new features of the recently released cc:Mail for Windows 2.0. Some of its new features include a new rules-based architecture which provides the ability to manage mail automatically by sorting, routing, forwarding or filing functions, depending on guidelines that the user provides.

Another new feature of cc:Mail for Windows called SmartIcons gives one-click entry to various Lotus applications including Ami Pro, 1-2-3, Notes and Freelance Graphics.

The goal of group scheduling is to make the process of scheduling meetings easier for workers in any group. Currently, meetings are scheduled using telephones, faxes, and email when contacting, inviting and processing group meetings. Lotus Organizer with group scheduling aims to overcome the obstacles by emphasizing Organizer's design strengths and the current investment customers have in their cc:Mail networks, the company says.


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## Introducing QEMM 7 The Memory Manager Worth Paying For

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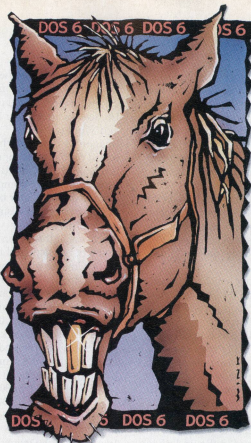
PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC will have. QEMM 7 lets you have it all while reducing the risk of 'out of memory' messages or crashes.



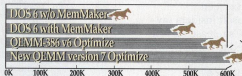
## DOS 6 Giveth; DOS 6 Taketh Away

The best news about DOS 6 is the stable of utilities it includes. Unfortunately, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 745K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using MemMaker, you could easily lose—not gain—available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to cut memory demands for these utilities by up to 80%.



# How to Look a Gift Horse in the Mouth



*We tested DOS 6 with and without MemMaker and with QEMM 6—and our new QEMM 7 runs away from all of them. See details of test conditions listed below.*

ensuring that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting DOS 6's multiple configurations gives you the flexibility

and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.)

## Page Frame: the Key to Your Future

There's been a lot of jealous talk about our patent-pending Stealth technology. Nobody else can duplicate its 48-115K gains.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame lets Lotus 2-3 run larger spreadsheets and WordPerfect 5x larger documents. It's also used by DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games for fast action. You sacrifice all this when other memory managers turn off the page frame.

Stealth saves you room to set up your PC with mouse, CD ROM, sound board, a network such as Novell NetWare, create 8-24K of extra memory for optimal use all of DOS 6's memory. You still have more than enough to run smoothly and safely.



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How we got the chart numbers: CPU—486 (73) ALR Power/business YEESA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACDS=0, 1, MSOUND.SYS, SNAKE2K.SYS, SCL3D.SYS, DOS SHELL=statement in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE (SL.COM NE2000.COM), IPXODI.COM, NETX or EMSNETX, MOUSE.COM, SMARTDRV.COM, PRISMCAP.COM. ©1993 Dataquest Office Systems. Trademarks are property of their respective owners.



## Next Word for Windows to work better with other applications

A preview of the next version of Word for Windows indicates Microsoft has improved the word processor's ability to share documents with other Windows programs in a number of areas. Word 6.0 for Windows (the current version is 2.0), but the company wants to synchronise the Windows version with the DOS version (number) will offer an enhanced interface, drag-and-drop text editing among applications, and inplace editing through its support of OLE 2.0. Version 6.0 will not ship initially with Microsoft's Visual Basic, Applications edition (VBA), but other VBA-enabled programs like the next releases of Excel and Project will be able to control the word processor.

VBA, which Microsoft says will eventually appear in all its major office productivity programs, will provide a way for developers to write agent programs that perform tasks across the company's Mac and Windows programs.

Microsoft says it is also improving Word for Windows' ability to convert WordPerfect files into Word files. The program will likely ship by the year's end.

**Dennis Allen**

## Microsoft Excel tease

Microsoft has been teasing users with sneak peaks at the newest version of its popular spreadsheet program, Microsoft Excel, Version 5.0.

Some of the new features include in-place editing, in-context menus, drag and drop between applications, and OLE automation, in which the program exposes the features that it will make available to other applications.

Analysts who have been briefed are telling of a 'smart' feature, code-named Tips Wizard, that looks for patterns of use and tells of a more efficient way of performing func-

tions. For example, if a user is going through a series of complicated keystrokes, the program alerts the user with a little lightbulb, so that a shortcut can be used the next time. The user can choose to wait until the end of the session to call up a report of all actions that could have been accomplished more efficiently.

Users say this type of help feature is important as products become more sophisticated.

Another feature that users have been waiting for is data pivoting, popularised by Lotus' *Improv*.

Excel's pivoting allows users to bring spreadsheet data into a separate area of the program with a different set of screens. Then, the data can be manipulated by moving column headings and labels. As well, links are maintained to the underlying data, so it can be updated based on changes made during pivoting. It is also tied in with the Scenario Manager, so users can view multiple versions of a file based on various pivots.

In Excel 5.0, users can set up visual links between, for example, derivative and precursor cells, which the user turns on when they want them to be seen.

Microsoft insiders say Excel 5.0's release may be scheduled to coincide with the October release of Word for Windows 6.0.

**Ann Steffora-Edittech International**

## Fractal compression

Perhaps the biggest obstacle to the electronic information highway is the problem of sending graphics images across telephone lines. Millions of people are already sending and receiving text-based email and messages downloaded from online services. But graphics are another story. Because graphics images are often several megabytes in size, they take a long time to transmit across telephone lines, and they require a lot of disk

space once they get there.

A small start-up company called Imagen, based in the US, has an answer for DOS and Windows users. Imagen's Fractern, which is based on fractal-compression technology developed by Iterated Systems, compresses images that will later be transmitted from BBSs. Using Fractern, BBSs can offer electronic information delivery consisting of full-colour images along with text to their subscribers.

Fractal-compression algorithms are based on a mathematical description of the image and are resolution-independent: a compressed fractal image requires the same number of bytes whether it is displayed on a 640 by 480-pixel VGA screen or on a 1024 by 768-pixel high-resolution monitor. According to Imagen's CEO, Dwight Jones,

the resolution independence of fractal compression offers a major advantage over the JPEG compression scheme, which is dependent on the resolution, thus requiring larger files for higher-resolution images.

Fractern is offered as a host system for BBS operators with an unlimited licence to distribute the user software to its subscribers. Any image compressed at the BBS end can be downloaded by users with this software. To the user, it appears that the image is being transmitted in realtime, but in fact, the compressed image is first transmitted and then decompressed by the user's software. In testing Imagen's system, full-colour images I downloaded took less than a minute to decompress.

**Nicholas Baran**

## Micrografx unveils dynamo graphics duo



Micrografx, a developer of graphics software applications for the Windows and OS/2 environments, last month released two major upgrades to its product line that set a new standard in high-end graphics applications for the Windows platform. Designer 4.0, the company's professional illustration and graphics design package, and Picture Publisher 4.0, its high-end image-editing application, both provide new high-end features and easier to use interfaces for Windows users.

With Designer 4.0, the Micrografx development team set out from scratch to create a 32-bit graphics engine for the product and built on Designer 3.1's feature list with a new streamlined interface, 27 precision drawing enhancements, and 3D drawing capabilities.

The new user interface features an interactive tool ribbon, customisable tool palette, pop-up menus and a hint-line at the bottom of the screen for faster learning and 'on the fly' reference. Designer 4.0 also includes new text handling capabilities as well as a full-featured image editor.

Picture Publisher 4.0 builds in new powerful features and ease of use to appeal to high-end graphics professionals and occasional desktop users. A new feature in Picture Publisher 4.0 is Object Layers, which based on traditional paste-up board metaphor, gives users complete control over the placement, transparency, size, rotation and order of bitmap objects. A short-cut feature, FastBits, lets users edit a small area of an image, while with the Low Res Image Open Option users can select a much lower resolution to view and correct corrections or effects.

Picture Publisher 4.0 also adds CYMK editing, 8-bit masks, a macro recording and playback feature and the ability to read and write multimedia AVI files.

Designer 4.0 and Picture 4.0 cost \$795 each, or \$245 for upgrades. Contact Micrografx on (02) 415 2642. A full comparative review of the above and other illustration/graphics packages will run in the November 1993 edition.

**Maryanne Phillips**

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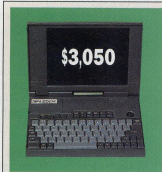


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## NETWORKING

## ITS and Microsoft chase Notes

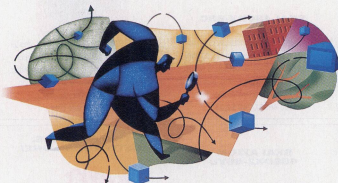
Microsoft in Australia has entered into a joint sales and supply agreement with Australian distributor, Information Technology Solutions (ITS). The agreement forms the next step in the evolution of Microsoft's workgroup computing strategy, bringing the company closer to being able to compete with Lotus Notes.

The motivation for the joint agreement, according to Microsoft enterprise applications marketing manager, Peter Brakatselos, is to find products and ways of working which will add value for the expanding community of Microsoft Mail users. The negotiations with ITS indicate that the agreement will fill that objective, he said, providing wider market opportunities for ITS, and better workgroup functionality for Microsoft users.

Brakatselos emphasises that the new combination offers the components of Notes-like functionality at a much more competitive price point.

Rules and imaging are emerging as important aspects of the workgroup computing environment, he said, and the products supplied by ITS, which fit into the broader enterprise-wide framework of MS-Mail, demonstrate a complimentary vision of the future for messaging.

ITS managing director, Frank Stranges, emphasises that in some areas the partners would remain head-to-head competitors. "We both still sell mail products, we're not about to stop selling Beyond Mail because we have reached an agreement with Microsoft,



whose mail product occupies a much larger share of the market. What we are saying, however, is that together we can offer the Microsoft community a complete set of tools, and our pledge to Microsoft is to provide the best functionality within the Microsoft user base."

The three basic components to the enterprise computing strategy are WinRules, from Beyond, which provides rules processing and workflow management capabilities, desktop imaging from Watermark and enterprise-wide document management software from SoftSolutions. The aim is to impose the disciplines of these products onto the broader structure of Microsoft Mail, thus providing a more cohesive and supportive environment for managing and sharing information.

The agreement comes at a time of discussion in the marketplace about the 'next-generation communications' products from Lotus Development, and the mooted single standard for its Notes and cc:Mail products. Feedback from customers about the difficulties in dealing with multiple transport APIs has seen

Lotus move to secure its market share, and developments which will allow Notes and cc:Mail programs to share message, transport and directory engines, as well as support for X.400, are expected to be announced later this month.

Microsoft and ITS will stage a joint roadshow in October to promote their composite workgroup strategy and the broader concept of enterprise-wide information management. These seminars will focus on the human interface, as well as the business benefits, according to Brakatselos. "We understand that what we are proposing is a cultural thing, the concept of the greater good which comes from information sharing threatens to push people out of their comfort zone, because we have so long accepted that information provides a personal competitive edge. Therefore, seminars for technology sake alone are not enough."

**Helen Dancer**

## Two 100Mbps Ethernet standards

After more than eight months of bickering and disagreeing

over the merits of two 100Mbps Ethernet proposals, the IEEE has given up trying to hammer out one standard and has decided to standardise both proposals.

The two sides — one including Grand Junction, Intel, Cabletron, Chipcom, Sun Microsystems, National Semiconductor, 3Com and Synoptics, and the other led by AT&T and Hewlett-Packard — failed to come to an agreement over how to change the Media Access Control (MAC) Layer of the original 802.3 10Mbps Ethernet standard to fit the emerging technology.

"We could have continued to argue for another eight years and I do not think that the two sides would have agreed with each other," said Patricia Thaler, chairperson of the IEEE 802.3 committee. "Both sides felt that it was critical that products come out right away we decided that it would be best to just come up with two standards and let the market decide which suits their needs."

The standard developed by Grand Junction, 3Com and others, called Carrier Sense Multiple Access with Collision Detection (CSMA/CD), retains the 802.3 Ethernet's data access method and only called for changes to the MAC's physical layer. It will run on Category 3 or two-pair UTP wiring.

However HP and AT&T called 100Base-VG, changes the CSMA/CD MAC layer and uses a 'demand priority' protocol which would allow Ethernet to handle more complex applications, and is a better solution for the future, according to officials at AT&T and HP, as Ethernet LANs



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begin to handle such low-latency applications as multimedia.

100Base-VG has received the support of Cisco, Banyan Systems, Microsoft and Novell. It will run on four pairs of voice grade unshielded twisted pair wire called Category 5 wiring.

While both sides will offer different products, both use the same packet format currently in 10Mbps Ethernet — thus enabling 100Mbps Ethernet technology to coexist and interoperate with 10Mbps LANs.

The 100BaseVG technology is made possible because it uses all four pairs of wires in 10BaseT twisted pair wiring to transmit and receive rather than just one pair to transmit and one pair to receive as is done in current 10Mbps Ethernet.

In March, HP decided to forge ahead with the development of 100Base-VG adaptors and hubs and are set to be available by year's end for approximately \$US400 each.

On July 19, Grand Junction announced a pact with several vendors, including Intel, to develop CSMA/CD adaptors.

The HP and AT&T demand-priority standard will fall under the wing of a new IEEE 802.12 committee, while

## NPI and SynOptics join on ATM

In an effort to get a jump on the still-nascent ATM market, SynOptics and Network Peripherals have joined forces to develop ATM adaptors to bring the high-speed networking protocol to the desktop.

The alliance calls for Network Peripherals to develop ESIA and Micro Channel adaptors as well as SBus adaptors based on SynOptics ATM technology. The new adaptors will be the first to bring Asynchronous Transfer Mode (ATM) down to the desktop level.

The SBus adaptors are set to be released at the beginning of 1994 for Sun Microsystems workstations. Then in the second quarter the EISA and Micro Channel bus adaptors will begin shipping.

While SynOptics and NPI may be the first to offer ATM adaptors, analysts are wary about the size of the market and the amount of user need there is for ATM right now.

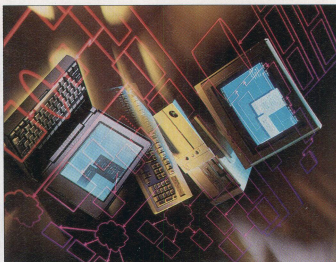
According to a survey of 53 US companies currently looking at ATM and other high-speed broadband services, many of the applications that would need the

speed of ATM are not yet available and may not be for a few years, according to Infonetics, a research firm based in San Jose.

Some of the applications that respondents believe will require 155 bits per second — the speed at which the adaptors operate at — in-

clude imaging, multimedia and graphics.

"Right now the market may not be there for ATM-type products and services because the applications are not yet ready for the speed," said Michael Howard, president of Infonetics Research. "There



SynOptics and Network Peripherals — jointly-developed ATM adaptors under development

are two main things that will bring ATM to the desktop — dedicate bandwidth and special applications like imaging which require a lot of bandwidth."

Nonetheless, SynOptics and NPI believe that ATM will be the future of client/server technology. "ATM is clearly a strategic technology base for future networks on an enterprise level," said Gordon Stitt, at NPI. "The integration of user, systems, clients and servers with the parallel switching architecture provided by Synoptic, however, will be critical for the successful wide-scale development of ATM."

**Mike Moeller-Edittech International**

## Ungermann Bass goes down-market with products

High-end networking company Ungermann Bass is not so picky any more over who it sells to.

After recent tumultuous days of losing its long-term CEO, UB is admitting that it is fast losing network market share due to a boom in lower-tiered offerings, and so will reshuffle its market focus. "While we've been a dominant leader in the very large high-end networking systems of Fortune 100-type

companies, the mid-tiered and low-end markets have grown extremely rapidly where we have no presence, so our overall marketshare has declined," said UB vice-president of corporate marketing, Steve Diamond.

The company has announced a 'major' worldwide realignment of its corporate strategy and operations, whereby it will not only sell into its usual upmarket networking markets, but is now aiming to grab up a piece of the pie downmarket.

UB has definite plans to compete with the likes of Cabletron and SynOptics by downgrading its current technology.

The company believes it will be a viable force by leveraging the technology of its Virtual Network Architecture (VNA) and other products to work in the mid-tier hub market.

"We'll make it easier to use, plug and play, and cheaper, while retaining its high-end features," Diamond said.

Although the company will eliminate 200 to 300 jobs worldwide, Diamond said it will be beefing up its sales force to use direct sales and telemarketing to distribute into its new markets.

**Charlotte Dunlap Edittech International**



the CSMA/CD standard will be placed under the IEEE 802.14 committee. Thaler said that the IEEE skipped '13' because of vendors' fear that it might hurt the success of products in the marketplace.

**Mike Moeller Edittech International**



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# Apple, SGI blaze video trail

New computers from Apple and Silicon Graphics signal the start of a new period for desktop systems: the era of video computing. Never before have video I/O and the processing of digital video been so tightly integrated into system hardware and software. By treating video like any other data type, such as text, graphics, or audio, these systems open up more effective channels of communication among individuals and workgroups.



*The Indy's most distinguishing external feature is the IndyCam direct-to-digital camera with built-in microphone, mounted on top of the monitor*

In fact, both Apple and SGI are positioning their new systems primarily as aids to improved business communications. The two companies are also avoiding the word multimedia, the meaning of which has become blurred. SGI calls its new technology digital media, while Apple has apparently latched onto the long-established term audio/visual, or AV. No matter what you call them, these sys-

tems are delivering on a key promise of multimedia: the seamless integration of all media types into a single box.

## Mac audio, Mac video

The new breed of Mac not only consolidates new features into a desktop computer but also provides new ways for you to both work in the office and collaborate with others, whether they're down the hall or across the country. Telephone services enable the

Mac to call people, act as a speakerphone, send and receive faxes, and operate as a modem to access online services. Built-in live video hardware lets you record and play back video and—with the telephone services—handle videoconferencing over a network or an ISDN line. Finally, sophisticated speech-recognition technology allows you to direct the Mac by voice command, while a text-to-speech engine enables documents to be read out loud with 16-bit CD-quality stereo

sound, freeing you to do other tasks as you listen.

Two new Macs represent the vanguard of these integrated systems. The high-end system is the Quadra 840AV, which has a Quadra 800 chassis and a 40MHz 68040 processor. At the low end, the Centris 660AV uses a Centris 610 chassis with a 25MHz 68040 processor. Both Macs use an AT&T 3210 DSP (digital signal processor) to

handle most of the digital signal processing in the systems.

The Quadra 840AV's VRAM frame buffer for its built-in video can be expanded from 1M to 2M so that it supports 24-bit colour on 16in monitors and 16-bit colour on 19 and 21in (1152 by 870-pixel) monitors. This makes the Quadra 840AV better suited for high-end graphics work than is the Quadra 800, whose 1M of VRAM limits it to 16-bit pixels for 16in monitors and 8-bit pixels for larger monitors. The Centris 660AV has the same frame-buffer size as the Quadra 800 and so supports the same video depths.

The Quadra 840AV with 1M VRAM, 8M RAM, a 230M hard drive, Ethernet and Apple CD-300i CD-ROM is \$8795. A Macintosh Centris 660AV with a 230M hard drive, 8M RAM, 1M VRAM, Ethernet, and CD-ROM will cost about \$5195. As usual, these prices don't include the cost of a monitor and keyboard, which add about an extra \$1800 to the price for the Audio Vision Monitor and Apple's new top-line keyboard.

## Video is the medium

These AV Macs treat live video as just another data type that's manipulated by the system and applications. Composite video and S-video input ports accept NTSC, PAL or SECAM-format video signals from sources such as a video camera or VCR. Live 16-bit video at 30 frames per second (fps) appears in a draggable, resizable window

on the Mac's screen. A menu selection allows you to set the size of the window to 160 by 120 pixels, 320 by 240 pixels, or full-screen (640 by 480 pixels maximum).

Off-the-shelf chips from

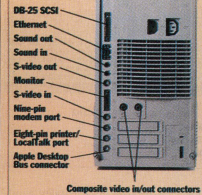


*The Mac Quadra 840AV: adding live video, speech recognition and telephone services to the Quadra line*

Philips digitise the video, perform format conversions and colour adjustments, and rescale the image. The video data travels through the computer on a separate 64-bit bus, so it doesn't tie up the main processor bus. When live video is active, the Mac's frame buffer is halved; the Mac's screen graphics are placed in one half and the digital video dropped into the other. An ASIC (application-specific IC) then melds the contents of both of the frame buffers into one screen image. A DAV (digital audio/video) connector provides access to the video bus' raw digital video and sound. This connector is mounted inline with a NuBus slot so that a NuBus board can tap into the DAV to perform data compression/decompression, encryption, or other processing.

Issuing a Copy command from within a supplied Video

## The Mac Quadra 840AV



The modular design of the Telecom Adapter lets you connect the AV Macs to any phone system while reducing cost.

The Apple PlainTalk microphone is designed to focus on an area 18 to 30 inches in front of it to help eliminate background noise.



The video application (upper left) displays live video and captured video images.

The Telephone application (right) uses the Telephone Manager to dial numbers and use the Mac as a full-duplex speakerphone.

The PlainTalk window (lower left) indicates speech recognition is active.

Monitor application captures a single video frame as a PICT image that can be pasted into documents, and QuickTime-savvy applications can create QuickTime movies of the incoming stream of video and sound. To get you started with recording movies, Apple can also provide a basic video/audio capture application called FusionRecorder (licensed from VideoFusion).

The capture rate and quality of the QuickTime movie depend on whether you're saving to memory or to a hard drive, what the image size is,

and what the compression settings are. NTSC or PAL video can also be sent out S-video and composite video output ports. The Monitors Control Panel can redirect the video so that a TV connected to these video output connectors can act as a monitor; this way, you can use a large-screen TV as an inexpensive presentation device for a group. Or, by routing the video to a VCR, you can 'print' a business presentation or an application demo to tape.

You can use the AV Macs' built-in video to have a face-to-face conference with another AV Mac user on an Ethernet LAN. To do this, however, the live-video image has to be small (typically 160 by 120 pixels), the frame rate needs to be reduced to about 10 to 15fps (which is the low end of what's considered to be acceptable viewing quality), and data compression has to be active to prevent saturating the network. Third-party software such as

Electronic Studio's ES.F2F application supplies an interactive storyboard and can share a foreground application window.

The Quadra 840AV and the Centris 660AV have an extensive built-in telephone architecture termed GeoPort. A Telephone Manager lets AV Mac applications dial numbers and handle two-way voice connections so that the Mac can operate as a full-duplex speakerphone. Control signals and digital data travel out an enhanced modem port to an adaptor pod called the Telecom Adapter. This adaptor pod contains the electronics that connect the Mac to the phone line, provides clock signals, and handles A/D conversions. This modular design reduces system cost while allowing the Mac to be connected to a variety of phone systems — especially important when dialing overseas, where different telephone standards abound.

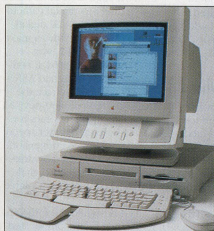
A POTS (plain old telephone system) adaptor is available, and ISDN and digital PBX adaptors will be available early next year. The modem port uses a new mini DIN-9 connector (actually a mini-DIN-8 with an extra pin

that supplies 5V power to the adaptor) that enables an incoming phone call to switch the Mac on.

In addition to providing these telephone functions, an AV Mac can also operate as a V.32 modem and a fax machine. These capabilities are implemented as programs that run on the 3210 DSP, and new features can be added later via a software upgrade. The DSP handles all heavy-duty real-time digital processing, such as the modem, fax, speech-preprocessing, and audio operations.

These functions don't have an impact on the main processor because the DSP has its own autonomous, real-time operating system, called the Apple Real Time Architecture, or ARTA. ARTA is a task switcher, jumping to a new DSP task every 10 milliseconds. When handling CD-quality sound, ARTA task-switches every 5ms. Note that if you're using the Mac as a modem, this function consumes enough of the DSP's bandwidth (24kHz) that you can't have CD-quality (44kHz) sound generation at the same time.

ARTA can also allocate idle time so that other non-real-



Apple's Centris 660AV is based on a 25MHz 68040 CPU



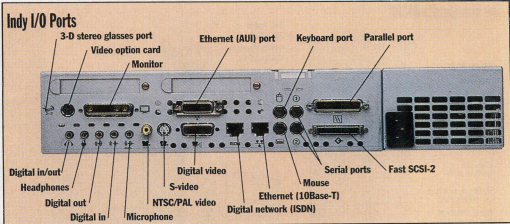
time tasks, such as 3D rendering or image filtering, are able to use the DSP. The Sound Manager now supports 16-bit stereo sound formats at sample rates that range from 8kHz to 48kHz.

The Telephone Manager, the Modem API, and the Sound Manager provide consistent device-independent connections to these services for applications. Besides the DSP, nine DMA channels handle sound, SCSI, floppy drive, and serial I/O, relieving the processor of these jobs. The ARTA and the DMA channels are the first components of the future microkernel, which is being added to the Mac OS in stages.

PlainTalk Speech Recognition (well-known by its code name, Casper) is a speaker-independent, natural-language, voice-recognition technology that is the result of five years of research by Apple's Advanced Technical Group. Speaker-independent means that PlainTalk requires no operators training for its voice-recognition software to function. It uses the DSP to preprocess and then slice the speech-input signal into 10ms packets. These are sent to the 68040, which evaluates several hundred possible words simultaneously using a phonetic-based pattern-recognition search.

A 60,000-word dictionary provides a word-matching reference, and back-propagation logic prunes the low-probability matches to boost recognition speed. The reference words are a composite of 500 speakers from all over North America to allow for American accents, so of course it is still going to trip up on the Australian accent.

A Control Panel lets you set recognition tolerances (how much PlainTalk actually guesses at an utterance). It also allows you to set an identifier word (for example, "Computer" or "Number 1") to help PlainTalk discern a command directed at it, and you can indicate if the identifier is not required for a user-specified period of time (for example, if



you're issuing a series of commands, you use the identifier only once, at the start of the command sequence).

Once PlainTalk recognises a word or phrase, it consults a Speech Rules file and fires off the appropriate Apple Events. A QuickKeys component from CD Software will be provided that lets PlainTalk invoke either AppleScripts or QuickKeys macros in response to a spoken command. The Rules file contains phrases that drive most Finder operations, such as opening and closing windows, volumes, and files. You can add your own rules to the file, perhaps making the phrase "Clean house" empty the onscreen rubbish bin, or you can have a phrase execute an AppleScript file or QuickKeys macro that starts a sequence of operations.

In addition, PlainTalk has a TTS (text-to-speech) engine that translates text to synthesised speech. The TTS engine has numerous built-in rules for generating realistic synthetic speech. For example, it recognises dollar amounts and dates and pronounces them correctly, and it raises the voice on the last word of a sentence ending with a question mark. The TTS engine doesn't require a DSP to operate; its output gets routed to the DSP, though, since the DSP handles all generated audio and thus reduces processor overhead. The quality of speech varies with the amount of memory available, and a male or female voice can be chosen.

Via the Speech Manager API, any application can select a section of text or an entire document to be read aloud. Using it along with PlainTalk's Speech Recognition, you might ask an AV Mac to "get my email and read it," which would start the execution of an AppleScript or QuickKeys macro. The script or macro would then launch a telecommunications applications, connect to the online service, download your messages, launch a word processor application, open the message files, and read the messages out to you.

The AV Macs provide new ways to communicate. First, they integrate the telephone, a modem, and fax capabilities into a single desktop system. Next, they supply ready access to video for any application. Finally, PlainTalk allows you to work with your computer more easily and offers aid to the visually impaired.

These features aren't additions — they're tightly integrated into the system.

## SGI's digital media

Silicon Graphics (SGI) wants to redefine the user interface with what it calls digital media communications. Its latest workstation, the Indy, provides all the hardware and software you need for capturing and communicating with sound and image over a network or over a digital phone line. Prices for the Indy start at \$10,877. Eventually, all SGI systems and upgrades will

provide this capability standard.

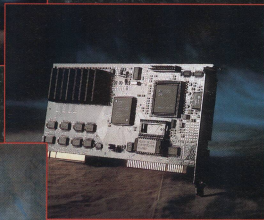
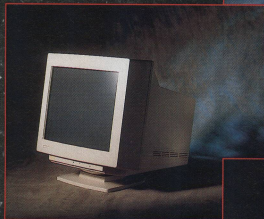
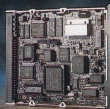
The digital media capabilities of this machine are particularly valuable to workgroups that need to share images and film clips over wide geographical distances — for example, medical teams, distributed engineering and fabrication groups, and research teams that use video as a data source. But as this technology spreads across the boundaries of different networks, nearly every computer user will benefit from communicating with digital media.

Despite its advanced capabilities for creating and displaying information, the Mips R4000PC-based Indy is SGI's low-end system. Its most obvious feature is the IndyCam, a little digital colour camera that sits atop the monitor. It looks more like a squashed Kodak Instamatic than the high-tech device that it is, a direct-to-digital camera connected to the SGI digital video port. It provides a maximum of 512 by 492 8-bit colour pixels at 30fps. It contains two SGI-designed ASICs for AD conversion from the CCD (charge-coupled device), as well as the electronics for colour balance, shutter speed, and colour space conversion. The output format is a variation of the CCIR-601 digital standard allowing for variable image sizes.

SGI designed the IndyCam to provide an uncomplicated and inconspicuous video input for videoconferencing and quickly capturing images



# Known Parts. A Known Quantity.



17" Monitor Trinitron  
26mm Aperture Grill  
1280 x 1024 Non Interlaced  
Microprocessor Controlled  
12 Custom and Preset Settings.  
Controlling: Pincushion,  
Horizontal/Vertical Size and  
Position, including Colour  
Calibration for Colour Critical  
Applications.



1.1GB 3.5" Hard Disk Drive  
Fast SCSI II 10ms average  
access time  
10Mb/s Data Transfer



32bit VESA Local Bus Graphics  
Accelerator  
24bit True Colour  
1280 x 1024 Non Interlaced

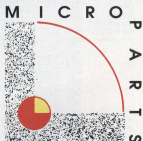
## MICRO PARTS

i486 System 66MHz  
8 ISA Bus Expansion Slots  
2 VESA 32bit Local Bus  
Expansion Slots  
Zero Insertion Force CPU  
Socket  
3 User Accessible Drive Bays  
2 Internal Drive Bays

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deep within the hardware, you need to feel comfortable that those  
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system is designed to give you that comfort."*



Bill Votsaris  
Founder and Managing Director  
Micro Parts Pty Ltd.



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for attaching to mail messages. The resolution is high enough to capture text from a typewritten page, yet it can be set to capture only the colour depth and image size that are necessary for a particular application, thereby reducing the data-set size of the images without compression. Without the need for compression and decompression computations, the rate at which the frames can be handled is greatly increased. (You control the IndyCam's settings for image size, colour, and contrast with tools that are part of the Indy's user interface.)

The IndyCam and digital video are only one of the possible paths for video input. You can feed analogue video from a camcorder, videodisk player, or video camera directly into the NTSC/PAL video or S-video port. The Indy uses Philips video-processing components to convert the analogue video formats to YUV multiplexed digital video.

SGI's IndyCam and analogue video input processing are the most obvious indication of the digital media potential of the Indy, but they're not the key to the Indy's 2D image performance. Thanks to the enormous

bandwidth (up to 267Mbps) of its graphics I/O bus and the technologically-advanced graphics subsystem, the standard Indy can blast 32 million pixels to the screen memory in a second — enough to regenerate an entire 1280 by 1024-pixel screen 24 times in a second, or (more typical of video image resolution) 640 by 480-pixel frames at 50fps.

Note that the live-video image is not in a separate video memory or even maintained as a separate video signal; it is mapped right there in standard video buffer space. This lets you grab it along with any other elements of your screen image for inclusion in SGI's standard desktop image capture and manipulation/translation programs.

SGI claims that the X-Window System graphics performance is 1.2 million 10-pixel lines in a second. This is even greater performance than that of Sun's recently announced optional GX and TurboGX-plus graphics accelerator boards, which, by Sun's claims, are only 480 thousand lines per second and one million lines per second, respectively.

The baseline Indy 3D graphics performance is not

quite up to the level of the un-enhanced SGI Indigo, according to the company. SGI has focused the Indy's performance on handling images and 2D objects. If you want to upgrade your Indy to this level of the Indigo, graphics accelerators are available from the company.

The Indy has the same audio subsystem as the Indigo: four-channel stereo input and output with 16-bit sampling rates ranging from 8kHz to 48kHz. The sound-sampling manipulation speed and resolution exceed those of CD recordings. The audio system is centred on the Motorola DSP 56001 chip.

The Indy has ports for two-channel digital audio, digital out, analogue audio in (microphone), and analogue audio out (stereo headphones). As with the IndyCam, the microphone and headphones come with the system.

Like any other SGI computer, the Indy comes with no standard floppy drive. But the optional drive is a 20M 3.5in floptical drive that can read and write Macintosh and PC floppy disks directly, as well as read and write standard Unix tar and cpio formats.

As if in anticipation of the

data superhighway, the Indy has ISDN among the many digital-media device ports. Other not-so-standard I/O connectors that come with system are 3D stereo glasses and 10Base-T Ethernet (as well as the old 25-pin AUI [attachment unit interface]). An R4000SC CPU with 1M of secondary cache is an option.

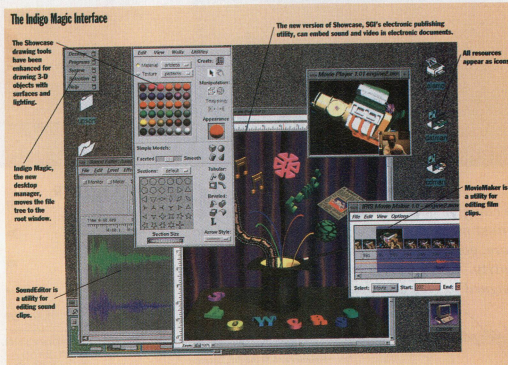
## SUI, not GUI

The Indy's sophistication becomes apparent once you boot the system and begin to use it. The term standard user interface has taken on new dimensions: voice and video, not only for output but also for input. The Indy interface is perhaps more appropriately referred to as an SUI (multi-Sensory User Interface) than as a GUI. SGI calls its new user interface Indigo Magic.

The microphone that comes with your Indy is not just for creating cue voice messages to embed in your documents; it's also for controlling your system and the applications that run on it. Speech recognition/voice control will have no limit on the number of words in the speaker-independent vocabulary. You should find that a vocabulary of 300 or fewer words will produce an instantaneous response from the system. The commands need not be limited to single-word utterances. The voice recognition can learn to improve it acquires experience with variations in the pronunciation of the words.

The voice recognition is a Silicon Graphics implementation of a technology developed by Scott Instruments of Texas. The SGI developer's kit includes libraries for implementing voice recognition and control that programmers can include in their SGI applications.

The voice-command input may be the most exotic addition to the SGI user interface, but it is not the most important: the entire Motif-based SGI graphics workspace and tools have moved up to a new level of refinement. The new



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## AT A GLANCE

**Macintosh Quadra 840AV and Centris 660AV****Distributor:** Apple Australia**Telephone:** (02) 452 8000**Price:** Macintosh Quadra 840AV, from \$8795; Macintosh Centris 660AV, \$5195**Silicon Graphics Indy****Distributor:** Silicon Graphics**Telephone:** (02) 879 9500**Price:** Entry-level system, \$10,877**In short:** By integrating vide and audio into their latest workstations, Apple and Silicon Graphics will change the way businesspeople communicate.

user interface looks like a combination of HP's VUE, Solbourne's virtual desktop, a little of NextStep, and a lot of the Mac. The goal was to combine an environment familiar to Mac users moving to SGI with the best features of the Unix interface.

SGI's new graphical system administration tools make it easier than ever to do the most common tasks. With some enforced uniformity among SGI's software developers, applications installation should approach the simplicity found in NextStep and on the Mac.

It remains to be seen whether software developers start incorporating the same graphical and digital media interfaces inside their applications as SGI has done with its Workspace/File/System management interfaces. Nonetheless, the overall environment in which the user operates is easy, flexible, and attractive.

Unix workstation designers can no longer assume that the world extends only to other Unix workstations; it also includes DOS, Windows, NetWare, Macintosh, and Apple networks. The Indy can reside on any of these networks, and it can read and write both standard MS-DOS and Mac disks on the optional 3.5in floppy drive.

Although the hardware and software tools already exist to make an ideal live videoconferencing system, the software will not be ready until the first part of

1994. At that time, users will receive an operating-system upgrade that will include the communications programs for multipoint conferencing with shared windows, shared whiteboards, and easy-to-manage remote control with other RTP-compliant Unix workstations. Toward the middle of 1994, the conferencing software will be upgraded to support the H.261 videoconferencing standard; this will let you trade video with nearly any other H.261-capable system, including the Mac (see also feature 'Video conquers the desktop' on page 148).

Unquestionably, the Indy, with its camera, microphone, and very high image and sound performance, is pushing the envelope of many technologies to provide integrated digital media capabilities. What's important is that the digital media components are matter-of-fact—bundled goodies that you'll find on all new SGI systems and upgrades even though you will probably buy and Indy simply as a general-purpose graphics workstation.

The AV Macs also push the digital media envelope, yet many of the technologies inside these systems have been in use for several years.

The AV Macs continue to build on this solid foundation, adding live-video, speech-recognition, and telephone services.

**Tom Thompson  
and Ben Smith**

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<input type="checkbox"/> General Ledger	<input type="checkbox"/> Products	<input type="checkbox"/> Other.....
<input type="checkbox"/> Suppliers	<input type="checkbox"/> Invoicing	<input type="checkbox"/> Business Use
<input type="checkbox"/> Payroll	<input type="checkbox"/> Customers	<input type="checkbox"/> Student Use

\*IBM or IBM compatible only

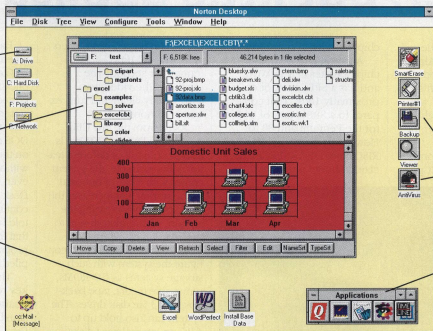
APCP

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The Norton Desktop is a completely integrated environment. You can drag-and-drop files from the drive window to a tool, drive icon, application, or onto the desktop itself.

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— PC Computing, 5/92

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# SYMANTEC.

# DEC's new PC packs lots of power, but little applications

**D**EC believes the power of its Alpha chip optimised with Microsoft's Windows NT will make the company a high-end PC powerhouse over the next few years.

Digital Equipment Corporation first unveiled its DECpc

chip has a lot of horsepower.

According to DEC, the chip operates at a 150MHz and has a SPECmark of approximately 100+. That compares to a SPECMark of 64.5 for the Pentium and 80 for Hewlett-Packard's 99MHz PA-RISC chip. DEC's SPECmark claims should note that the

movie clip from Ghostbusters at nearly real-time — 30 frames per second. The quality of the video was surprisingly clean and runs extremely smoothly.

Aside from the raw CPU power, the DECpc AXP 150 is also packed full of different features. For example, the system comes with 512K of onboard cache storing that increases the CPU speed by increasing the amount of information sent to the SRAM. Five internal storage bays allow users to configure the system with such storage systems as CD-ROMs, removable media, tape backups, and 3.5in disk drives. The system can also hold up to 4.2G on internal hard disks.

Another impressive feature of the AXP 150 is its I/O capabilities. There are six ESIA slots — which run at 33MHz as well as additional ESIA, ISA, PCI, of SCSI controllers, 10BaseT and thin coaxial networking connections, and built-in fax/modems. The computer also comes standard with two serial ports and one parallel port.

The AXP system comes standard with a Compaq Q-Vision SVGA video adaptor with 1024 by 768 resolution running at 72MHz. Users also have a choice of a 14, 17, or 19in colour monitor.

Back at the end of May, when the system was released, DEC claimed more than 300 applications were going to be ported to the new Alpha-based system. In fact, DEC claimed that "thousands of WIN16 and DOS applications would run on the Alpha/NT architecture without modification." However, when I tried to load AutoDesk 3D Concepts the system continually crashed. I was then told by DEC technical support that the reason was that the program had not been recompiled to run on either platform.

That may be one of the key reasons that close to three quarters of the 99 IS professionals surveyed by research firm, Intelliquist in the US, said they are not planning on moving to the Alpha architecture for at least six months.

In all, I would recommend the system to application developers and power users because of the AXP 150's superb CPU power. However, by moving to the AXP 150, users are making a clear commitment to NT. I think it would be much wiser to wait for the next six months to let the system fill out its planned line of NT-based applications before even thinking of moving to the Alpha platform.

**Mike Moeller**



*Ready to run with Windows NT? So is DEC's high-powered RISC machine, the AXP 150*

AXP 150 at the end of May, and while the system is shipping, applications to run on the new architecture and its operating system of choice are slow to embrace the high-powered RISC machine.

Nonetheless, DEC has released a high-quality machine, that when fully stocked, will offer users a tremendous amount of power on their desktop.

The most impressive feature of the AXP 150, with prices starting at \$11,994 for the base system, is the speed of the CPU. While there are no 'benchmarks' out yet for either NT or the Alpha architecture, it is clear that the

final ratings are not available until the final release of NT is out the door.

Aside from the numbers game, the DECpc AXP 150's multitasking capabilities are very clear. When testing the machine, I was able to run a demo of Massteck — a CPU-intensive CAD program — at the same time I was logging on to a system administration program, thanks, in part, to the 64-bit power of the Alpha chip and 32M of RAM.

Another program that showed off the CPU power of the AXP was its ability to compress and decompress MPEG video clips. For example, the system was able to run a

## AT A GLANCE

### DECpc AXP 150

**Distributor:** Digital Equipment Corporation

**Telephone:** (02) 561 5508

**Price:** \$12,995 (configuration outline below). Prices start at \$11,994

**Configuration** 14in SVGA, 16M RAM, 245M hard disk, keyboard, mouse, NT preinstalled, CD-ROM, floppy drive, 12-month onsite warranty, free delivery

**In short:** DEC's AXP 150 is designed for application developers and power users making the commitment to Windows NT.



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# Play with simply more money

**P**ersonal finance management software has been largely defined by Quicken and Microsoft Money. Computer Associates launched its new contender, Simply Money, with a splash in the US, giving away a reported one million copies. In Australia, the package (bundled with QuickTax) is selling for a nominal introductory price.



range of built-in categories (such as utilities/ electricity or business travel) to classify transactions. These have an US flavour, but are easily customised. You will want to use these to take advantage of the program's capabilities.

The program understands both cash and accrual basis accounting. Inter-account transfer lets you track cash flow

applicable prices for its calculations.

Simply Money's scheduler lets you enter future transactions, and will remind you as they fall due. It will also remember details of like transactions (such as salary payments), and guess the details when you repeat the transaction. The package sports an advisor, which tells you when accounts are in the red, or when your phone bill has gone through the roof. The advisor can also help you budget.

Both graphing and reporting are strong in Simply Money. You can select (and customise) graphs and reports on almost anything in the package. The program supports automated cheque printing.

Several excellent features are of little value to Australian buyers. The program will phone CompuServe to get stock prices — which is fine if you bought your shares through Wall Street. US tax support is built into the category structure. I was unable to re-map any of the US tax classifications, or add new ones. Let's have an Australian version!

The interface is button-based, with an emphasis on drag and drop. It's intuitive and

## AT A GLANCE

### CA-Money

**Distributor:** Computer Associates

**Telephone:** (02) 923 2066

**Price:** Introductory offer: \$19.95 (+\$11.95 delivery) with QuickTax

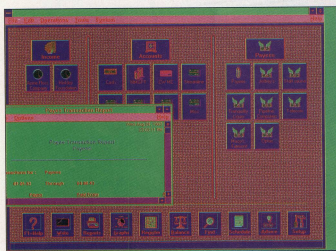
**Requires:** Windows 3.1, 5M disk space, 286, 2M RAM (4M rec)

**In short:** Simply Money is rich in features, and offers them at a compelling price.

easily customised. The package is mostly comfortable in Windows, though it sometimes departs from Windows conventions. While it's easy to display single accounts in 'register' view (like a bank statement), I was unable to edit more than one account at one time.

Simply Money's rich feature set is well documented on paper and online. While its interface lacks finesse at times, and some features are specifically designed for the US, it still offers much to Australian buyers.

**Michael Aitken**



Computer Associate's Simply Money personal financial management package is intuitive and easily customised

Personal finance packages are designed to help you manage your money — at home or in small business. This can involve balancing accounts, tracking and classifying income and expenses, scheduling payments, and basically watching your net worth grow.

The basic building block in Simply Money is an account. There are 10 sorts, including cheque accounts, credit cards and mortgages. The program's setup assistant helps you put names to your accounts, main income sources and payees.

The program comes with a

and assets by using 'payable' and 'receivable' accounts.

If you've ever wanted your very own 'home loan simulator', then this package is for you. The loan calculator will schedule a loan, and solve what-if questions (like how much can I borrow at 10 per cent for 12 years, paying \$500 a month?). The package has four other financial calculators.

Simply Money is strong in investment management. It can track and account your share and bond holdings. It knows about brokerage and dividend reinvestment. It will store a share price history, and will use the most recent



# AST's fast Premmia 4/66d

**T**his name-brand hardware manufacturer unveiled the Premmia line of high-end PCs and workstations earlier this year. The company has traditionally done well in the corporate sales area, always managing to cram that 'something extra' into its systems. We had the opportunity of looking at a Premmia 4/66d and have to say yes, AST has done it again with a superbly crafted performance PC.

Externally, the system does not look like it can pull any punches; the unit sits squat and nondescript. It looks like a run-of-the-mill AT box. No low-profile case, flashing, gaudy LEDs. Just a key lock, power, reset switches and discrete LEDs for power and disk access. The keyboard is light but strong with a great feel — like a good cake; not too light, not too heavy. It comes packed with a Microsoft 2-button PS/2-type mouse, DOS 6.0, Windows 3.1 and some system utilities and drivers with some comprehensive documentation. The User Manual is a slim volume that is surprising with the amount of useful information packed within its pages.

The bald specifications of the machine say that the 4/66d is a 66MHz DX2 PC fitted with 8M of RAM standard and an EISA expansion bus. AST also makes much hoo-ha over its LocalLink graphics adaptor. This is a local bus implementation, placing the graphics subsystem on a direct path to the CPU.

AST has not disappointed in this regard, which is not surprising considering the company has collaborated with video graphics specialists ATI, in placing Mach32 accelerator chips on the motherboard to do the video grunt work. Video RAM is a stand-

ard 1M, upgradable to 2M. The result is smooth, flicker-free instantaneous video response in all graphical applications. AST has provided a Windows driver. Other drivers

remaining left-hand side of the machine is devoted to the EISA expansion slots, five in all, and a curious slot for a Pentium upgrade processor board.



*The AST Premmia 4/66d is a superbly crafted machine and a top performer*

are available through dealerships or downloadable through a BBS.

Internally, the Premmia 4/66d shows its class. The model we looked at is the 173W version, which comes with the software hotloaded onto the 170M Quantum hard drive. The drive is situated towards the rear of the machine on the right-hand side. There is ample space here for additional drives, and the data connector cable to the IDE controller mounted on the motherboard has a spare connector for anyone considering expansion with the built-in disk controller.

The centre section makes way for the external drive devices. There is one 3.5in floppy that comes standard and below this are bays for two additional 5.25in devices. Mounted on the rear wall behind the drives is the big 200W power supply. The

Alternative, additional cache RAM can be mounted in this slot. The proviso with using this special slot is that the corresponding EISA slot cannot be used, or if the cache option is fitted, then only a half-length card.

To get to the motherboard means referring to the manual.

The centre

and right sections unscrew or disconnect from their anchoring points either on the case or on the motherboard, to lift out entirely, giving free range over the processor and video RAM. Any upgrade to the SIMM memory sockets is accessible without recourse to removing the drive/power supply 'cage' arrangement.

A total of 128M RAM can be configured onboard. The processor is an interesting piece of work, situated next to the SIMMs. The easy upgrade ZIF (Zero Insertion Force) type of socket has been used. I imagine the entire Premmia range shares the same board making for convenient processor upgrade.

As mentioned before, upgrade to a Pentium through AST's proprietary CUPID architecture is through removing the existing DX2 chip and placing a Pentium processor board in the special slot. How-

ever, AST and this reviewer recommend not making upgrades yourself (apart from memory), and instead should contact AST service personnel.

Performance-wise, the 4/66d appeared to fly. We were impressed by the Dell 486DX2/66 earlier this year, but this machine seems to have oomph to spare, which is surprising, considering the benchmarks results were mediocre.

We had no trouble with the ATI Windows drivers, which gave what we visibly perceived to be the best video response I have seen in an Intel DX2-based PC, even at 1024 by 768 resolution. The graphics WinMark clicked over at 15.3 million in 640 by 480 by 256 colours; the Disk WinMark scored at 37,906, while our tests gave a DOSMark rating of 58.48 for the Premmia 4/66d 173W.

AST has used some other nifty features like a Flash BIOS — making BIOS upgrades a simple matter of loading from a disk — a remarkable set of password security options and the easiest CMOS setup I have seen.

This machine is quality and maintains AST's deserved reputation for exceptional design skill at a not unreasonable price.

**David Lin**

## AT A GLANCE

### AST Premmia

**Distributor:** AST Research

**Telephone:** (02) 415 5400

**Price:** Approx \$6750 4/66d with 170M;  
\$7625 4/66d with 340M.

**In short:** The Premmia is a high performance desktop PC with blazing local bus video.





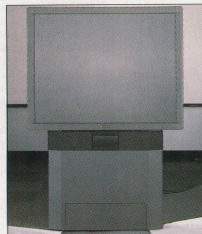
VPH1271QM/VPH1251QM

The VPH 1271/51 QM data projectors offer a wide variety of inputs to allow for large screen projection of video and computer graphics. Images up to 6.0m wide can be projected. Wide input scan rates allow for computer signals from PCs to workstations to be connected with ease.



VPH1000QM

Whether it be home theatre or for the pub or club, the VPH 1000 is the perfect projector for showing videos, TV or any other video source. A high light output allows screen sizes over 5.0m wide.



RVP6000QM

The RVP 6000QM is the ultimate in data projection. Due to the screen's design and the brilliance of the projector the RVP6000QM requires no room lighting changes. Computer signals from PCs to workstations can be connected as can all video standards.

**SONY**

D I S P L A Y  
S P E C I A L I S T  
N E T W O R K

## R:BASE 4.5 more efficient

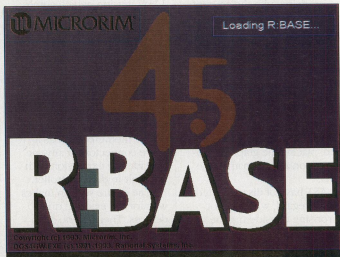
Whether we like it or not, Windows has had a massive impact on the expectations we have from software. Forget all the fancy technical aspects; OLE, DDE, online context-sensitive help and full graphical interaction. The big impact Windows has had is to make software look good.

As a result, perfectly able and very functional packages such as R:BASE can begin to look a little dull in comparison. Nonetheless, the part played by DOS databases should not be underestimated — there are enormous numbers of happy users who are unlikely to change instantly to Access simply because it looks better.

Database developer Microrim has always had a small but enthusiastic section of the market that swears by the product, and it is unlikely to change now — even if R:BASE 4.5 still uses text screens, design levels of the late '80s and has 'relief buttons'.

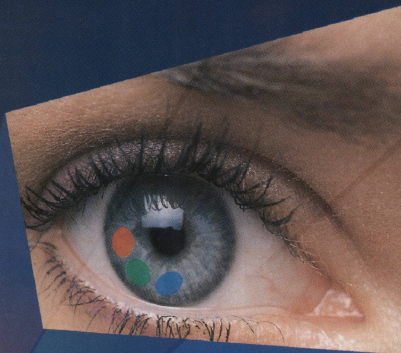
The main changes to the latest version are the use of a new filing system which, Microrim says, increases both speed and security by separating the data, indexing and other sections into separate but linked .RBF files. These can be stored in separate directories across network drives if required, which obviously give advantages in both security and storage management terms. Conversion from the old .RBI type files as used in previous versions is fully covered in the manual.

Checks are also included in the new system, which allows the program to ascertain database integrity during loading, and to synchronise entry values and times across the three files. This is invaluable if you should have a hardware crash while working; it gives full retrieval a sporting chance in most cases. The new filing system also allows for more flexible naming than previously, with up to 18 characters per 'object' (defined field).



Version 4.5 of relational database R:BASE features a new filing system to increase speed and security

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D I S P L A Y  
S P E C I A L I S T  
N E T W O R K

Screen and form design gets a lift with improved mouse and menu section capabilities over Version 4.0, as does indexing, which has been extended to include several special and global search fields. The authors claim this makes searching much faster than previous versions. Another useful boost from Version 4.0 is the inclusion of a revamped Query Optimiser. This gives the capability of temporary indexing while looking for particular data across the whole database.

Other listed upgrades are the full Level 2 SQL capability, Windows and DOS SQL engines, and better forms options for smoother entry procedures.

Installation is simple enough with the six 5.25in disks and one LAN pack disk supplied; Novell, 3Com and LAN Manager are all supported. The program itself takes up a reasonable 6M —

not bad for a fully relational 32-bit database — with samples and tutorial taking up about 1M extra each. Booting up Version 4.5 gives a slightly jazzier intro screen, but then it's back to DOS screens.

The input screen is not as slick as some, with a basic status line and menus at the top. Offsetting this, full mouse support is available, and fields can now be resized and moved with the mouse. Much better.

Likewise, menu dialogues are now what Micromin describes as 'walkable'; they scroll to match the input characters used to save time during selection. Learning Version 4.5 has a slight aid in the form of the tutorial, but don't hold your breath if you are a beginner; it is basic with a capital B. Finding the tutorial can also be tricky. It is not even mentioned in the Startup Guide, and you have to search for it in the User Manual.

R-BASE can access dBASE files and is listed as being able to concurrently access (both read and write) dBASE files along with other network users. We were not able to check this, but it must be seen as a useful plus for users not wanting to be locked into one engine.

A couple of other useful facilities make life easier with R-BASE. If you need to shell out to DOS, you are presented with an R: prompt instead of C:, which is very useful in reminding you where you are in the system. Optimising your database and entry is also given good attention; this is one area where some other products definitely fall down.

In use, we had no problems with R-BASE, but its individual style required some effort for us to become familiar with it. But despite being a DOS clunker, it

## AT A GLANCE

## R-BASE 4.5

**Distributor:** Micromin Australia

**Telephone:** (07) 818 4060

**Price:** \$1095; upgrades \$260.

**Requires:** 286 or higher (for 32-bit version), 2.5M minimum RAM, 6M hard disk space, DOS 3.1 or higher

**In short:** Functional upgrade from Micromin which improves functionality and moves towards user friendliness, but still has some way to go on the graphical interface front.

still seems fast, capable and efficient. When is the full Windows version coming out?

**Jeremy Torr**

# Tektronix IISDX colour printer

This, the latest colour printer from Tektronix, is a solid-looking, compact, dye-transfer printer that prints at 300dpi on either overhead transparency material or a white plastic-like 'paper'. The dye transfer process doesn't work on ordinary paper, which makes the printer relatively expensive to use — \$3.60 per A4 page. However, it produces bright, glossy prints, which won't scratch or fade.

The IISDX comes with all the connectors you're likely to need, including serial, parallel and AppleTalk, (Ethernet and EtherTalk are available as options), and also has a SCSI port to connect an external hard disk to. The printer comes with 16M of RAM, which can be increased in increments of 4M up to a maximum of 64M.

Setting up is very easy and the printer comes with Post-



*The Tektronix IISDX delivers rich colour prints — particularly with blacks and dark colours, which no colour laser can match*

Script Level II drivers for either Macs or PCs; the latter cover Windows and many other popular applications. The Windows 3.1 drivers, used for this test, are easy to install and include a utility called Tekcolour which improves your screen display so that it matches the

printed output more closely. The printer was tested with several popular Windows applications, including PageMaker 5.0, CorelDRAW 4.0 and Ventura 4.1; no compatibility problems were found with any of them.

The dye transfer process involves the printed sheet being passed through the printer three times, with one of the three primary colours being transferred on each pass. This makes the IISDX fairly slow — it takes about five minutes to print an A4 page — and since it is noticeably noisier than a laser printer, you would need to site it as far away from your work area as possible. The sound it makes when the 'paper' jams is quite alarming, but removing

the jammed material was simple, and the printer warms up and continues printing very quickly.

The colour accuracy of the IISDX's prints is good but not spectacular. It seems to be more accurate when the application utilises the CMYK colour model, as compared with Pantone colours, but this

## AT A GLANCE

## Tektronix IISDX colour dye-transfer printer

**Distributor:** Dimensions

Graphics

**Telephone:** (02) 929 5855

**Price:** \$20,994

**In short:** While expensive to run, the new Tektronix IISDX colour printer will please the specialist markets that need better quality results.



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For the name of your nearest Samtron dealer, please call Samsung Information (Aust) Pty Ltd on (02) 955-3888.

may be due to the application, rather than the printer. The prints also seem to suffer from occasional flecks of missing colour, where one primary colour hasn't transferred properly, but there was no time to see whether cleaning or adjustment would have overcome this problem.

What is very attractive about the prints is the richness

of their colour, particularly the blacks and darker colours, which can be disappointing on colour laser printers. This richness, combined with their low-gloss finish and durable surface, makes them ideal either as inexpensive colour proofs or for use in packaging and similar mock-ups. The prints have a 'finished' look, which will be particularly use-

ful in any type of presentation work. Despite the fact that the IISDX is only a 300dpi printer, it uses proprietary image enhancement technology to improve the smoothness of its results; type and other fine details reproduce well, even at small sizes.

Overall, the IISDX is a very impressive machine, which will certainly bring dye-transfer

technology within the reach of many more users. I suspect advertising agencies and design studios will be among the first to acquire one, because of the slick, glossy results, but the machine's cleanliness (there's no toner, ink or wax to spill) and its relatively low cost should attract a very broad range of users.

**Jim Endersby**

## Approach 2.0 easy to use

Full-featured Windows database packages were thin on the ground until the release of Borland's Paradox, and Microsoft's FoxPro and Access. While Lotus has not yet released a programmable database, Approach plugs the end-user database gap in its product line-up.

Approach 1.0 was launched in the US in March 1992. Lotus bought the company in June 1993, and has recently begun marketing Approach 2.0 in Australia. A new version, in line with Lotus standards, is in the works.

The aggressive marketing of Access and Paradox has put an unprecedented amount of full-featured database power in



people's hands. In contrast, Approach is aimed at people who don't want to write a single line of code, and don't want the entire feature list. It's for people who want simplicity with minimal compromise on power. It also offers a smooth step up for people who have traditionally used spreadsheets for database work.

Access can now be bought as part of Microsoft Office. Don't be surprised to see Approach bundled with Lotus Smart Suite in the future.

Approach supports relational operations, and makes them relatively easy. The package plays client to many servers. A wide range of external file formats (including Oracle and SQL Server, in ad-

dition to the standard Paradox and dBASE formats) can be accessed seamlessly. It supports record locking, and maintains Paradox, FoxPro and dBASE indexes, ODBC and Btrieve support is coming.

Approach views let you mix and match tables (up to 10). Tables created in the package are your choice of dBASE, FoxPro or Paradox (with some limitations). As well as the usual data types, Approach supports memo and object fields (for pictures, sounds, etc.). The definitions of your queries and other settings (such as data rules, form design and macros) are stored in Approach .VIEW files. Many .VIEW files can be open on the desktop.

Approach offers three main perspectives on your data — form, list or report mode. The package throws up a default form, and customisation is simple. Design is done with drag and drop, aided by dialogue boxes. As well as cosmetic controls (colour, font, etc.), the package lets you attach pick lists and check boxes to fields, and place macro command buttons on forms. A form can include multiple child detail forms.

Approach macros support automation through point-and-click editing. Navigation choices, field names and spreadsheet-style functions are presented on pick lists.

As with other design jobs, reporting in Approach is easy. There is ready support for form letters and mailing

### AT A GLANCE

#### Approach 2.0

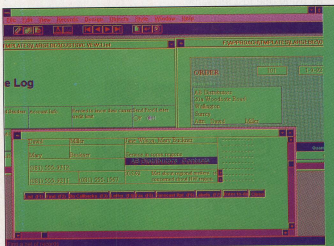
**Distributors:** Sourceware; Lotus  
**Telephone:** (02) 350 7777

(Lotus); (02) 427 7999 (Sourceware)

**Price:** \$179 (introductory offer)

**Requires:** Windows 3.0, 4M disk space, 286, 2M RAM (386, 4M recommended)

**In short:** A strong contender in the end-user database market, Approach is relational and easy to use. Lotus' marketing power and planned enhancements should increase its appeal.



Approach provides access to foreign formats and supports the relational model, providing the power to access data with ease

labels. As well as standard reporting features, it boasts eight pass summaries.

Approach drives home its ease of use with a swag of starter .VIEW files. These include template applications for employee records, room bookings and office inventory.

Approach is a strong contender in the non-programmable database market. With its capacity to access foreign formats, and support for the relational model, it has the power to access corporate data with ease. It would appeal to those who want the fundamentals of end-user data access and management, with a minimum of learning and distraction.

**Michael Aitken**

# Mitac 4020G/C colour notebook

**A**lthough the Mitac is a nice machine, nothing really startling or innovative smacks the user in the eye at first glimpse, or impresses on first use. Plus it costs a sizable \$5350 with no trackball.

It is a standard A4 clamshell design, using an Intel 486SX running at 33MHz, with, in our case, 8M of RAM and a 120M hard disk.

Standard configuration is 4M of RAM expandable up to 20M using a non-standard

item with 16-colour resolution, measuring 170 by 130mm, driven by a local-bus driver. Keyboard is an 84-key unit based on the normal AT layout, plus a function key for accessing the numeric keypad keys.

On powering up with the loaded DOS 6.0 and Windows, the user is greeted by the fact that the screen is small. Although it is crisp and clear with very little shadowing, using standard 10pt typefaces proved difficult due to their size. Adding to this problem was the fact that special video driver (CHIPS Linear driver 2.0) was installed to drive the local-bus video hardware. This unfortunately removed the option of specifying mouse trails on the screen. As a result, it was always a hunt to find where the cursor was hiding.

The keyboard was okay, but not outstanding. The travel was short, but a reasonably high pressure was required to switch the keys. The status display gave indications on the disks, power and lock keys, but nothing about power status or battery life.

Controls are courtesy of a group of buttons on the space just above the keyboard. Push-button on/off switch, digital contrast and brightness keys, and in our case the trackball, are provided.

The screen display controls worked very well and gave a good range of options that coped with most lighting conditions. Unfortunately, the



*The Mitac clocked good performance results, but battery life was poor*

memory board. Peripheral extras include a 3.5in floppy drive, a docking station bus slot, the usual serial, parallel and external VGA sockets, a removable battery and a spot where you can put either integral trackball or modem. Our model had a trackball. Power is supplied by a 9.6V 2-amp NiCad battery, which can be required. The screen is a passive-matrix VGA

## AT A GLANCE

### Mitac 4020G/C Colour Notebook

**Distributor:** Mitac Australasia

**Telephone:** (03) 585 1055

**Price:** \$5350

**Specifications:** 486SX/33, 4M RAM, 120M hard disk, 16-colour VGA screen, DOS 6.0, Windows

**In short:** A solid machine with a good video driver but a little short on the extras which would make it stand out from the crowd.

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APCP



trackball/mouse was not so hot; being on the left it did not suit the right-handed user. And because the buttons are recessed, it required a slightly squinty use of the hand to use. It certainly looks neat but the Compaq trackball shows how ergonomics work better than this kind of rectangular 'looks neat' design.

The manual claims the 4020G/C is rated as lasting for 1.5 hours in normal conditions.

Realistically, you can cut this down to an hour or less for applications with a fair amount of disk access — and most software does use a lot of disk access today — which really isn't that good. One of the reasons for this could be the speed of the machine. Power management can definitely cut down the battery consumption, but it sometimes reflects in performance, too. The Mitac was no slouch in our tests, and

performed especially well in the CAD section thanks to the local-bus hardware. Disk performance was also excellent with the 200M unit in the review machine, but all this grunt paid its dues in terms of the low battery life.

Expansion is not as good as some of the current competition, with either internal modem or a trackball but not both; no PCMCIA slots; and no provision for an extra battery

instead of the floppy. Hard disk upgrades are a dealer option, not user serviceable.

Overall, the latest from Mitac is much of a muckiness. With a bigger screen, better trackball, longer battery life and better power management it would be really good. As it is, it is good for CAD use as long as you don't want to use it much longer than an hour at a time away from the mains.

**Jeremy Torr**

## NeXTStep: ready-to-go OS for PCs

If you think the choice between OS/2 and Windows NT (not to mention UnixWare and Solaris) is complex, now add NeXTStep for Intel processors from NeXT to the mix.

First developed as the operating system of the now discontinued NeXT computer, the NeXTStep workstation OS brings a distinctly different look and feel to today's PCs. With the arrival of NeXTStep, object-oriented operating systems are no longer the stuff of science fiction for PC users. It is just this design approach that makes NeXTStep an extraordinary development platform.

Other than built-in networking, multimedia, email, true

However, one thing you won't get in this version is the ability to run MS-DOS or Windows programs. This was promised as an option through Insight Solution's SoftPC, but it's one that won't be fulfilled until NeXTStep 3.2 appears (a free upgrade to registered users will be offered).

NeXTStep's interface is completely object oriented, which means that Workspace Manager's individual elements — icons, menus, and windows — can be taken apart and sewn back together to form a customised interface.

The object metaphor is carried beyond the interface. For example, linked editable items, such as documents, use Object

NeXTStep has superior interoperability features. Besides the TCP/IP and NFS client/server networking capacity it inherits from Unix, NeXTStep comes ready to step into existing NetWare networks as a NetWare client. And it can use not only Unix and DOS files, but Macintosh files as well.

The development environment and language — Objective C — make building programs from reusable objects easy.

NeXTStep isn't high and dry on the application side, either. WordPerfect, Mesa (a spreadsheet), and Gupta SQLBase Server are now available, to name a few. NeXT includes a catalogue of apps along with a sampler CD-ROM in NeXTStep. It also comes richly endowed with its own apps.

NeXTStep is a truly rich package, but it's not perfect. Like any 32-bit operating system, there's a paucity of drivers. Though it has a more complete collection of video

drivers than OS/2 2.1, it can work only with PostScript printers. One other oddity: NeXTStep can only work on a system with a single 3.5in high-density floppy disk drive. The 5.25in disk drive must be disabled if you have one.

NeXTStep doesn't belong on everyone's desktop. The massive system requirements alone (16M RAM, 120M hard disk space) put it beyond the reach of most users. Still, in testing, NeXTStep worked like a fine Swiss watch both in standalone mode and concurrently as a node on NetWare and TCP/IP networks. And adventurous programmers will be delighted with NeXTStep's development environment. We foresee NeXTStep taking a place similar to that of the Macintosh: an operating system that's not for everyone, but extraordinarily powerful and easy to use for those willing to travel a path away from the mainstream.

**Steven J Vaughan-Nichols**



Another OS: NeXTStep hides its Unix-based core with a great object-oriented interface

multitasking, and support for 24-bit true colour graphics, what does NeXTStep deliver? First and foremost is a breathtaking interface — the Workspace Manager — that rivals and even surpasses that of the Macintosh.

Links (similar in concept to Windows' Object Linking and Embedding) to transport changes from a document to a spreadsheet automatically and transparently. Applications don't need to be aware of this facility since it's built in.

A multithreaded, multiprocessing microkernel operating system called Mach makes the

Workspace Manager run smoothly. Mach gives NeXTStep the ability to run multiple applications at once without the starts and stops that plague the performance of other operating systems that multitask applications.

### AT A GLANCE

#### NeXTStep Release 3.1 for Intel Processors

**Distributor:** Softpac

**Telephone:** (02) 214 2692

**Price:** \$4950; full developer licence \$1395; runtime

**Requires:** 16M RAM (24M recommended); 120M hard disk space (200M recommended); 486DX processor or better, SCSI CD-ROM drive  
**In short:** The first PC-based version of NeXTStep has intriguing interface twists and the ability to multitask flawlessly. The catch: it doesn't run DOS and Windows apps.

# **Are all computers the same?**

**Some people would bet their business on it.**

# They share the same t a little easier to ha

Pictured below is the Northrop Advanced Technology Bomber. Or, as it is more commonly known, the Stealth Bomber.

Just precisely how advanced its technology is, however, is a matter for some conjecture, as the Pentagon is not renowned for sharing its secrets.

What we can reveal, is that it incorporates an innovation first developed by us and known as "Rigid-Flex". Put simply, this technology packs more chips and more circuitry into far less space and was initially used in Compaq notebooks.

Other examples of our commitment to advanced technology are more widely known.

We were the first to introduce an industry-standard portable computer. The first to embrace the 80386 chip. The first to develop a file server capable of outperforming minicomputers. The first to release a 486SL with colour TFT display. The first to introduce Triflex System Architecture.

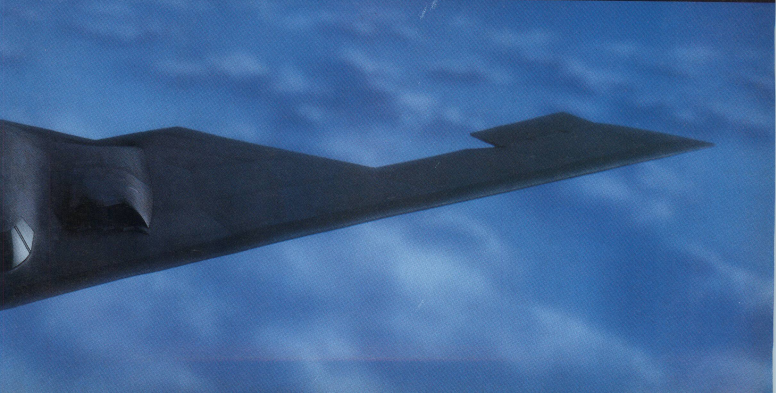
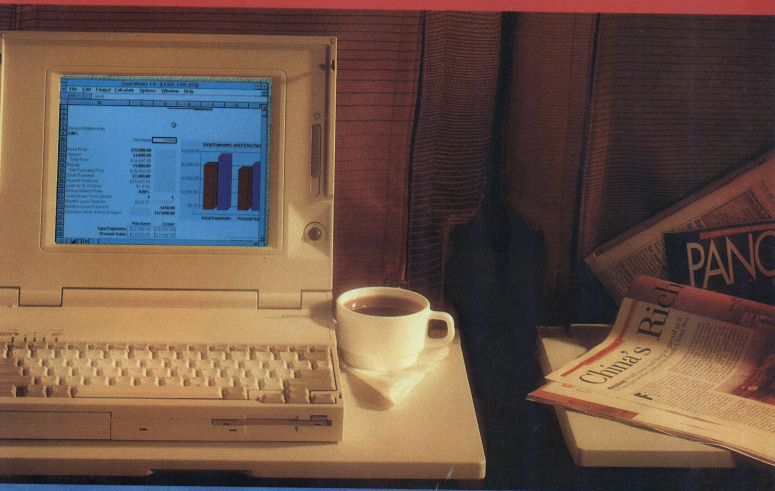
And, as of this year, the first to release a Pentium-powered personal computer. In fact, we had "Pentium-ready" architecture long before the chip itself was available.

Which simply proved that, once again, our technology was ahead of its time. (19 months, 2 weeks and 2 days ahead, to be precise.)





Technology, but ours is  
ndle at 30,000 feet.



# Compaq is still at le of the com



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# Fast one metre ahead petition.

Fast computers can dramatically increase your productivity. But only if they're working. Which is why we subject our products to the most ruthless quality testing.

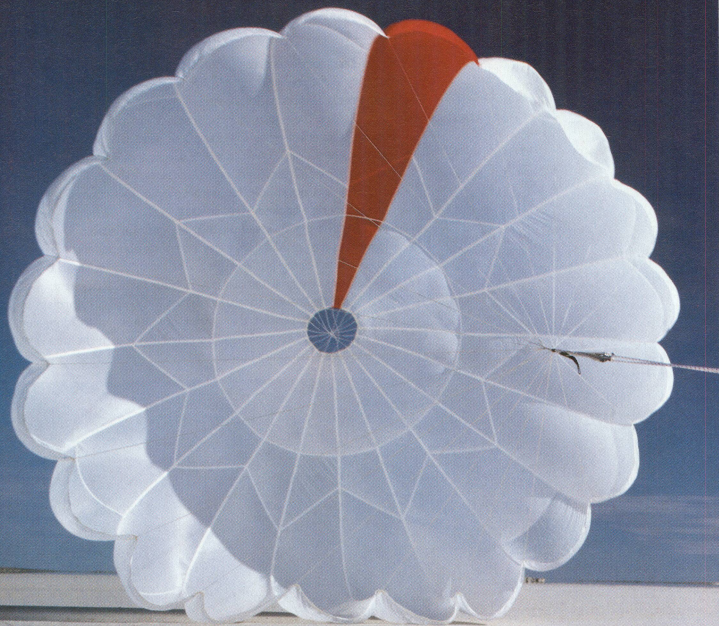
Before they go into production, every new Compaq has to endure temperatures as low as -10 degrees Celsius and as high as 140 degrees Celsius, often in quick succession. Then come humidity tests, corrosion tests and pressure tests. Finally, if the personal computer is a notebook, it's unceremoniously dropped one metre onto a concrete-backed, steel surface.

Yet, having survived all this, life gets no easier. Once a new model goes into production, every one of its components is rigorously tested before being put together. And prior to leaving the factory it undergoes one final, exhaustive, 96 hour full-function test.

Such dedication to quality makes a Compaq, regardless of its price, far less expensive than other computers in the long-run. It also makes it capable of handling anything you might throw at it. And we mean that quite literally.



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# LAN speed record.

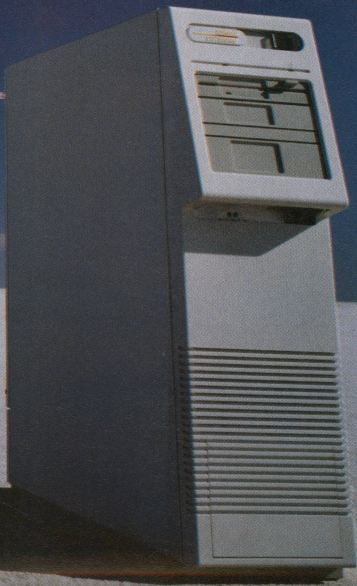
Earlier this year the computer experts at the Transaction Processing Council\* confirmed something we had long suspected. That is, on a dollar for dollar basis, a Compaq Systempro/XL offers a far more cost-effective networking alternative than the traditional minicomputer route.

And that's not even allowing for the fact that a Compaq file server does not require its own attendants or its own air-conditioned office. It's more than happy to provide exceptional performance and reliability as well as complete upgradability, from underneath a desk.

So if you're thinking of networking, think of Compaq. Unlike others, we can help you break records, not the bank.

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SUN SPARCserver 10 Mod. 41 c/s	SUN OS 4.1.3/Sybase	\$7,087
IBM RS 6000/580/ c/s	AIX3.2.3/Informix	\$8,042
DEC VAXserver 6000-640 c/s	VMS 5.5/VAX Rdb	\$8,574
IBM AS/400 9406 E70	OS/400 / OS/400 internal	\$17,993

\*As at 19 March 1993. TPC is a non-profit organisation established by hardware and software vendors. \*\*Transactions per seconds.





# A Compaq is designed as your c

Obsolescence is one feature we don't build into our computers. Take for example, the Deskpro/M range. By simply replacing modules you can cost-effectively upgrade from 25MHz, 486 performance right through to 66MHz, Pentium performance. Increasing memory is just as easy, as the memory controller automatically adjusts as you upgrade.

Our commitment to open industry standards also ensures seamless compatibility with your existing software and hardware so you don't have to worry about the cost and disruption of retraining staff.

And should your company's growth bring about a need for networking, you'll find our server range as easy to upgrade as our PCs.

All of which is reassuring news for companies looking to avoid failing performance and memory loss in their old age.





**d to grow as quickly  
company.**



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that won't suit you**





# nty four computers . And one that will.

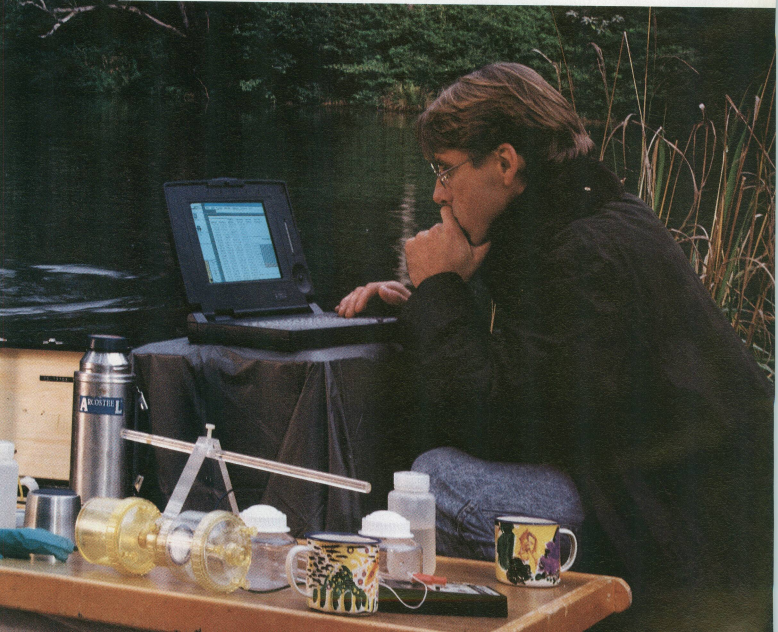
Could it be that you are thinking of studying the invertebrate fauna of Tasmania's Boobyalla River? If so, then we recommend recording your findings in one of our Contura notebooks. After all, they are light, powerful and exceptionally robust.

Thinking of replacing the minicomputer? Then it's a Systempro you'd be after. It's fast, reliable and able to serve hundreds of personal computers at a fraction of the cost of a mini.

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Or is it simply unparalleled processing performance that you seek? Then go no further than the Compaq Deskpro 5/66M. Its Pentium chip makes it about twice as fast as a very fast 486.

In fact, with a range of 75 personal computers for you to choose from, you'll find Compaq has a solution for just about everyone. Except the indecisive.





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programme t**



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Our support programme is, we believe, testimony to our quality control. Because only a company with absolute faith in its products' reliability could offer a 3 year parts warranty with 12 months free on-site service.

Or a support service staffed by technicians and systems engineers with instant access to a wealth of technical information. Or an on-line subscriber service which provides easy access to technical experts in more than 160 countries. Or a self-maintenance programme incorporating extensive training.

Not forgetting our rigorous, and on-going, accreditation system which ensures that our resellers are fully conversant with each and every aspect of our computers.

Or, indeed, the Quickfind or Advanced Network Support services, or any of the other services that make CompaqCare the most comprehensive support programme in the industry.

All of which any one of our 250 resellers will be more than happy to expand upon at length, whenever you have a few spare minutes. Or better still, a few spare hours.



**\$14,000 will buy y**  
**Then again, s**





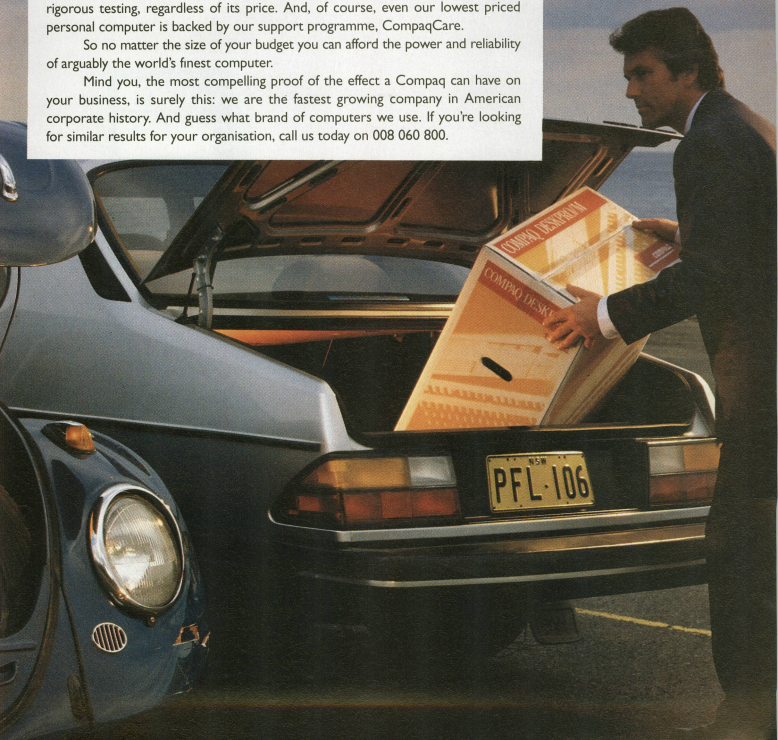
# ou a new Compaq. o will \$2,000.

There once was a time when our computers were renowned for their high performance, high quality, and high prices. Nowadays however, you can buy a Compaq for about the same price as a cheap clone.

But that's where the similarities end. Because, unlike any clone, every Compaq is built to the same exacting standards and subjected to the same rigorous testing, regardless of its price. And, of course, even our lowest priced personal computer is backed by our support programme, CompaqCare.

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Mind you, the most compelling proof of the effect a Compaq can have on your business, is surely this: we are the fastest growing company in American corporate history. And guess what brand of computers we use. If you're looking for similar results for your organisation, call us today on 008 060 800.





At Compaq, we believe that you really can make a difference. All you have to do is try just a little bit harder tomorrow, than you did today. It's a philosophy that's worked for us, perhaps it could work for you.

**COMPAQ**

# The interface fact

**I**s the software created today easier to use than the software made five or 10 years ago? The answer is yes, it is easier to use — but I don't believe in the concept that today's developers have discovered a magic way to make software intuitive.

Apple has done a lot of business by claiming that its operating system and hardware are intuitive and easy to use. For people who are frightened of computers, and there are many of them, the Macintosh was an easy way out. It was easy to learn — a new user would not have to appear a fool in front of anyone while they fiddled around trying to get the computer to do something.

Apple, of course, poured derision on the DOS user interface. DOS was an easy target. It didn't *have* an interface. (Or when Microsoft finally added one with the DOS 4 shell it was so ugly and un-

helpful that nobody used it of their own free will.)

Anyone who has tried to explain to a complete novice just how to use a DOS computer, knows that it doesn't have an interface. A small blinking message 'C:' is meaningless unless you already speak DOS.

In that sense, the Macintosh was easy to use. However, it is far from intuitive. Again, anyone who has had any experience training anyone on a Mac will know that it is not intuitive to double click on an icon to start a program. If anything is intuitive it is to click on the icon *once* to start the program.

The great advantage that the Macintosh had (an advantage now shared by Windows) is that there are things already on the screen when you start the machine. In other words, the system has a user interface already built in.

Instead of being left with a blank screen you get words,

icons, boxes, scroll bars and all sorts of stuff. Almost all these things will react if you play with the mouse a little. The cursor even changes so that you can see that there are other options.

computers that we have on our desktop. Yet that is exactly what we have got. Both the Mac operating system and Windows (which draws heavily on the Mac for inspiration), rely on this 'desktop metaphor'.




BY JEREMY HOREY

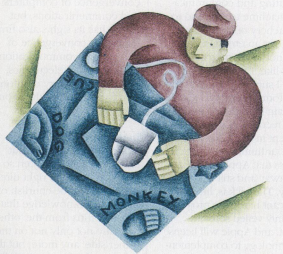
*How intuitive is your interface? While we may have more user-friendly machines, their interfaces are not yet as intuitive as we would wish.*

Even so, this to me does not mean that it is an intuitive interface.

The Mac has the famous 'desktop metaphor'. This is meant to mean that things are ordered in the same way as they are on your desk. I am afraid that I don't see any connection at all. My desk never looks like that. I don't organise things by type of task. I organise things by topics. Neither the Macintosh operating system nor Windows encourages you to do this. In fact, it would be crazy to expect that we would even want to keep the same sort of system on our

So what would an intuitive interface look like? Well, I don't know, but I do suspect that it would be different for everybody. There would probably be groupings so that some would find a text-based system easy and some would find a graphical user interface easy. When it comes to interfaces I am always reminded of my mother and her first experience with a PC. She simply typed in, "Word processing please."

A truly intuitive interface would have responded by bringing up a word processor. 





# Newton: more than a new toy

I have seen the future — and it is very small. Part of it, (only part), is the Apple Newton, a new class of electronic device, the PIE — Personal Interactable Electronics, a tool which combines and surpasses the pocket-sized PIMs and never-light-enough notebooks that we carry to keep us connected in the 90s.

of the device can be prevented. You may guess the password, but if you can't replicate the handwriting, forget it.

Fulfilling the function of an intelligent notepad, it understands that if you draw a line across the page, there marks a new thought, so it provides a new page with the date on the top for that new thought. Not only that, it recognises that a

bunch of notes, addressed to a given person, printed on letterhead and faxed to him, you expect that that's enough instruction to get the job done. If then five minutes later, the assistant appeared in the doorway with the typewriter, the liquid paper, the rolodex, some letterhead paper and the fax machine, you'd have the right to feel a little disappointed. Yes, they are the tools to get the job done, but what's really required is a little active assistance. The Newton, properly armed with database information, or interfaces to databases in other systems, be they Apple-based or DOS/Windows machines, has the intelligence to recognise intent, and has evolved the provision of the best tools into active assistance in completing tasks. It interfaces seamlessly with DOS/Windows machines, providing the necessary cross-platform instructions, so that reconfiguring or messing with the PC is unnecessary.

Newton, in my limited experience, is the first portable computing and communications machine to respond to this catchery of the modern world, for an emphasis on tasks, not tools, with an Optus-like, "Yes, we can."

So, I suppose you bet they cost a fortune, and will justifiably remain high-priced until Apple recoups its massive investment in R&D? Nuh uh. In fact, your humble scribe here predicts that Apple could give them away and still make money. The trick is, like every significant hardware project, it is a thinly veiled software project, and Apple will license its technology to complementary and even competitive providers, to grow the market

and create a threshold which will even compete with the mighty Microsoft. Technology partner, Sharp, has signed an agreement to license Newton technology, presumably intending to use it for the basis of a successor to the well-loved Sharp Organiser, and is currently working overtime producing Newtons (available RSN) at its factory in Japan.

Competitive advantage is an easy sacrifice when the imperative is market share, and the consolation is the prospect of a fat fee for licensing, and an increasing proportion of technology partners queuing up to register. And market share is infinitely more important than price per unit, as Apple Australia's David Rigg asserts.

It must necessarily be, since the Newton technology strategy and the Microsoft At Work program are pitched to collide head-on in the battle to control our VCR's microprocessor, our televisions, telephones, and the office photocopier. Both companies are preaching the convergence of computers and communications, but Apple has its sights also firmly set on the convergence of computing, communications and consumer electronics, and better delivery of information for business, education and home environments.

The market alone will determine which of the strategies will prevail, but since Newton has taken so many steps in the right direction, it would be churlish of us not to acknowledge that those boffins from the 'other side' are not only on the 'other side' any more, but that this time they've got it really right. ☺



HELEN DANCER

*Apple's Newton is the portable powerhouse with intelligence we've been waiting for.*

Newton is not only light and powerful, it is very, very smart. It allows a person to write on the screen and retain their own handwriting (signatures on contracts, in one fell swoop), or alternatively convert the written text into characters. It in fact learns a person's individual writing idiosyncrasies, by experience or by playing a writing recognition game, so that unauthorised use

scribbled out thought is one which is no longer required, so it erases the words, sketches or figures in a puff of smoke.

Newton marks the difference, according to Newton exponent Michael Tchao, between providing the tools to do the job, and offering active assistance. If, on returning from a meeting, you told an assistant that what you needed was a letter formed from a

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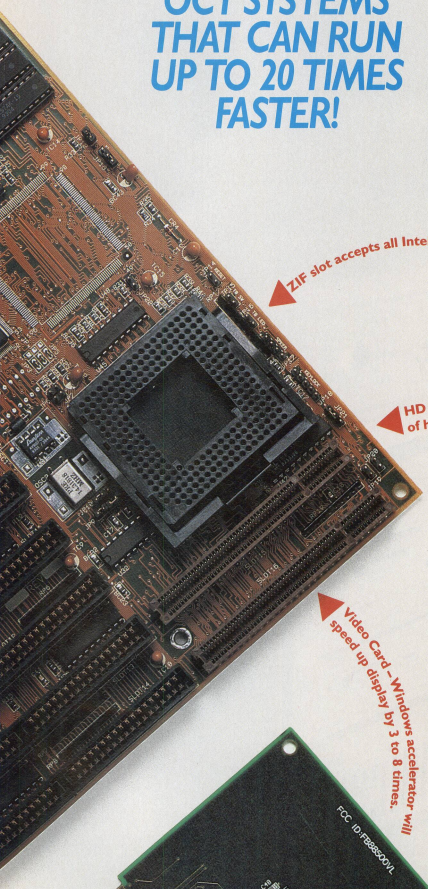


# OCT SYSTEMS THAT CAN RUN UP TO 20 TIMES FASTER!

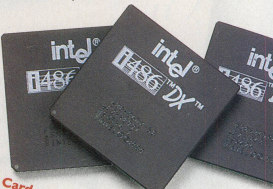
If you use Windows, you have probably learned two simple truths.

First, you need horsepower, the more the better. Second, too many 486 computer systems ask you to compromise because they are simply not designed to run graphic intensive applications at full speed.

One problem is bottlenecks. Despite having a 32-bit processor, many use a 16-bit (ISA) data bus from the CPU to the video card and hard disk. At the same time, the "clock speed" of the data transfer will probably be only 20% to 50% of the processor itself.

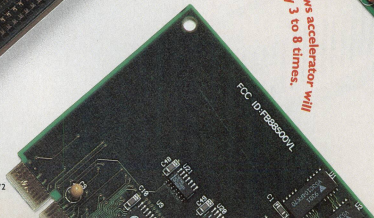
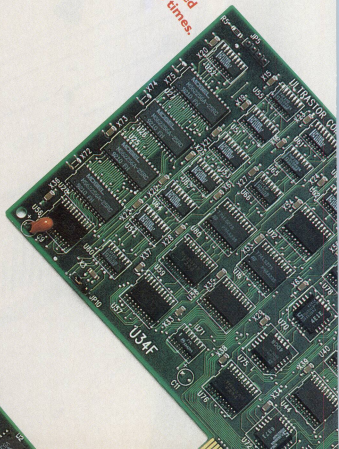


◀ ZIF slot accepts all Intel 486 chips.



◀ HD Controller Card - Increase the speed of hard disk data transfer up to 20 times.

◀ Video Card - Windows accelerator will speed up display by 3 to 8 times.





The other problem is display. Most standard video cards, even super VGA, do not have independent graphic acceleration. As a result they rely on the CPU. This drains resources, and backs up more data at the bottlenecks.

## OPTIMA ELIMINATES THE BOTTLENECKS

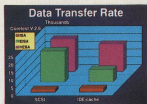
The new Optima Computer Technology (OCT) 486 VL system eliminates these problems. Cost effectively. While offering a simpler upgrade path that can grow into one of the world's fastest workstations.

Compared to standard ISA technology the basic configuration improves data transfer and display up to 7 times faster.

The secret is a motherboard with dual Bus Master VL slots to your two most important peripherals – the hard disk and video card – giving you 32-bit data expressways that run at your CPU's external clock speed.

Standard systems use one slot for a VESA IDE controller for the hard disk. The other slot has a 32-bit VESA controlled Genoa super VGA Windows accelerator card. It supports up to 16.8 million colours, refresh rates of up to 72 Mhz and resolution up to 1,280 x 1,024.

All systems come with 4Mb of RAM, expandable to 32 Mb, and all but the 486SX system come with a 256k memory cache as standard.



Typical data transfer rates for VESA, EISA and ISA systems using IDE cache and SCSI-2 controllers. (Can vary by HD and controller brands.)

## SIMPLE EXPANSION FOR MAXIMUM PERFORMANCE

Because OCT systems are designed for upgradeability, this is only the beginning.

For instance, if data transfer is critical, we have several options all the way up to an EISA mother board using an UltraStor SCSI-2 VESA controller. It has up to 20 times the transfer rate of a standard ISA/IDE configuration.

Or, if your work includes CAD or complex graphics, you might prefer either other third party high-end VESA cards, or our soon to be released dual hard disk/screen controller card.

Motherboards come with a continually upgradeable ZIF (zero insertion force) CPU slot as standard, that accepts every current Intel chip from 486SX to a 486DX2-66, and even Pentium overdrive chips as they become available. The CPU is supported by a Dallas battery with life time warranty as well as an automatic

configuring BIOS. We offer almost every conceivable case, screen and hard disk option, along with floppy and tape drives, CD-ROMs and magneto optical disks.

Monitors are available in 14", 15", 17" and 19", and will support resolutions up to 1600 x 1280 non-interlaced.

Lastly, our new semi-automatic production line features a triple quality control system, backed by a full 48-hour burn-in.

And because OCT is the fastest growing computer company in Australia, we are able to offer a quality and buy rate backyard operators can't match, at an overhead structure far lower than the big boys. Which is why our systems are backed by one of the best warranties in the business, three years.

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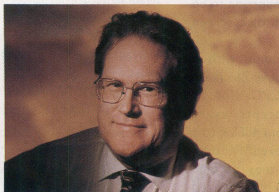
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# Will Windows turn proprietary?

**W**ill Microsoft use court-upheld lock-out techniques to prevent unauthorized use of its technologies? That's exactly what Nintendo and Sega did, and Microsoft could do it too.

look like a public service if handled right. "The licences are to make sure the public gets only quality code written by approved vendors." Sounds good.

Notice how Microsoft officials have repeatedly em-



BY JOHN DVORAK

*The computer industry may be doomed unless control of Windows is wrested away from Microsoft.*

If Microsoft goes ahead and designs a Windows operating system that requires special application I/O and runs only Microsoft-approved programs, then applications developers would either have to pay a licence fee or be locked out of Windows altogether. Microsoft has a reputation for thinking along these lines. The book *Hard Drive* mentions a company ditty that goes, "DOS isn't done until Lotus won't run."

Once it establishes sole control of Windows, would Microsoft set up a licensing arrangement like the Nintendo gambit? Why not? It would

phased that, according to contract, IBM will no longer have access to Windows code after September. This, to me, is a signal that Windows will become more closed than ever.

The way to avert this is by supporting something called Public Windows Interface (PWI). PWI was first proposed by Sun Microsystems and now others are joining in — with enthusiasm. It's designed to keep Microsoft from continually altering the Windows application programming interface (API) to the point where Windows will be a Microsoft-only proprietary system.

Microsoft says that it competes fairly in the applications arena. It claims that just because it develops the operating system software used by most computer users, it doesn't use this to its own advantage to create a quasimonopoly. Really? Well, the company can prove its assertions by supporting PWI. While PWI will ensure an open Windows standard, it will, ironically, increase the popularity of Windows and probably increase Microsoft's total sales. Microsoft can still sell Windows by the carload — without the expense of internally developing the API. It's an unparalleled win-win-win situation (no pun intended). A win for the applications developers who compete with Microsoft; a win for Microsoft; and a win for the users who can feel more confident that whatever they buy will not hit a dead end in some distant future.

But does Microsoft want to do this? After all, this increase in sales won't match what a monopoly can accomplish. It's easy to figure that Microsoft won't support PWI and will instead gravitate

toward the closed Nintendo approach. After all, the company has said over and over that it wants to dominate the software applications arena.

For proof of just how dangerous and relentless a competitor Microsoft is, just see how effortlessly it can nearly sink a competitor by giving away disk compression and how it can eat into Lotus and WordPerfect sales with foolproof bundling deals. In Microsoft's vision, there's no room for anybody else.

So if Microsoft fights PWI, then it's obvious that Microsoft is headed toward the closed system where it will completely control competitors. I'm so convinced of this that I now recommend to people who plan to run Windows exclusively that they buy only Microsoft applications. Why? Because if the suspected Microsoft plan works, users will eventually have to buy Microsoft apps anyway. They'll be the only ones that work. So we may as well learn the Microsoft apps now and at least be ahead of the poor saps who bought from the competition. ☞



# Going for broke?

If the constant parade of software upgrades is driving you nuts and putting a dent in your pride or your pocket, spare a thought for the retail community. As it tries to keep pace with the latest packages of code, it is finding more and more money tied up in software that no-one wants. Over \$10 million in outdated software could be sitting on dealer shelves, gathering dust.

The computer retailing game has changed considerably in the last few years. Once the haven of small, specialist stores, it has now become attractive to major retailers such as Brashers, Harvey Norman and Myer. They have computer departments that are jam packed with the latest goodies — and they are interested in more than just the Christmas market.

Specialist retailers usually buy their stock from distributors such as Merisel and Tech Pacific. They buy in small quantities, reordering when stock runs low, and often ordering to meet a specific order. Because the orders are small, these dealers rarely get caught with large quantities of outdated software.

This is not the case with major retailers. For them, a minimum buy is often 10,000 units, an investment of a million dollars or more. If the product is hot, that investment won't sit on the shelves for very long. If it is so-so, sale time may be a chance to get rid of it without taking a bath.

But if the software proves to be a dud, that's a lot of money tied up in paper and plastic that is only good for recycling. For instance, if a chain has a hundred stores across Australia, and each one has one unsold copy of a \$1000 software package, that's \$100,000. Ten such packages tie up \$1 million.

Resellers try to make life as easy for retailers as they can, by notifying the 'channels' of new products as soon as they can, often in conjunction with a free upgrade period. Users who buy a soon-to-be obsolete version of software qualify for a free upgrade to the new version, when it becomes available. This clears some, if not all, old stock out of the channel and doesn't disadvantage users.

However, if vendors give too much notice of a major new release, they can stall sales of existing product as users decide to wait for the new version. It is a fine line between too much, and not enough notice.

The question is what to do with the remaining, unsold stock. Major resellers may demand that the distributor takes back dead stock, effectively exchanging it for new stock, and distributors try and pass it back to the manufacturer with as little loss as possible. Sale or exchange is a none too subtle game of pushing water uphill — it can be done, but it isn't easy.

In the games area, there is more of a problem. Distributors are rarely able to give stock back to the manufacturer, which accounts in some measure for the higher margins and the demise of local distributors.

If that's the way upgrades are handled, what about the effect of price reductions? When vendors announce sudden price drops, what happens to the existing stock that has been purchased at the old price? Dealers get credit for the difference, but they need to sell more copies of a product to make the same turnover. It is a zero sum game, benefiting the consumer.

Unsold, obsolete software loses none of its functionality. It still has power for word

processing, design, calculation or whatever. What it doesn't have is market value, at least in the retail channel. At best, it is worth what it costs to manufacture and bring to Australia. That might be \$50 or less.

There might be a way to absorb this obsolete software, a way which benefits consumers, resellers and vendors, a way that reduces piracy and

certainly reduce the instance of software piracy (BSAA take note). The retailers don't lose, as these bargain-basement sales are sales they might not have made, and consumers who want the latest version will still be paying regular prices. Distributors don't lose, as they won't have to try and return worthless stock to manufacturers. Manufacturers don't lose, for they will reap fu-



KESTER CRANSWICK

*Is selling software going to send retailers broke? Effective absorption of obsolete software is important for retailers to provide adequate service to customers, and returns for themselves.*

makes Australia a more productive nation.

Instead of exchanging old software for new, returning old software to distributors where it is warehoused or returned to the manufacturer, distributors and manufacturers ought to allow retailers to sell the software at bargain-basement prices — \$100 or less for a typical desktop application.

Who loses? The consumers don't, because they get last year's software at an affordable price. This would almost cer-

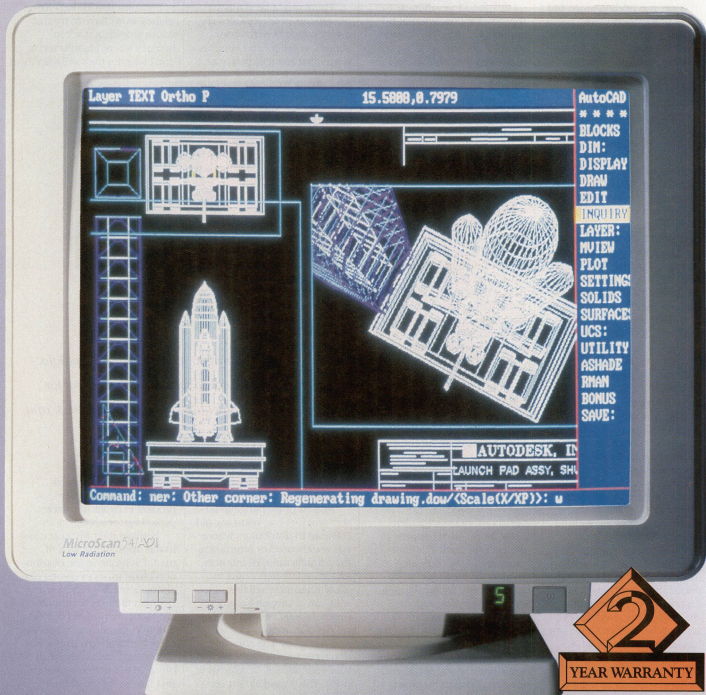
ture returns as consumers upgrade from the older product versions they have picked up for a song.

Perhaps the only obstacle to this approach is lack of trust. Everyone in the distribution chain trusts everyone else about as much as the warring Bosnian factions. Distributors are particularly afraid dealers would overstate the numbers of old software packages. But this seems a relatively small obstacle to an arrangement that has no losers.



If you think you've seen it all...

# Wait Till You



# See This!

After sales of our MicroScan series topped a million, we knew we'd hit on a good idea.

But, in the fast-moving colour monitor market, you don't just need last year's best seller. You need this year's too. And that's why our 120 R&D staff got their heads together and came up with the next generation MicroScan series. Already it has received the "Editors' Choice" award from PC Magazine, (March 16, 1993). It's got all the usual hot-selling features and more ...

- ☐ TCO approval (optional)
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And of course, the second generation continues the ADI commitment to offer a full range of microprocessor controlled monitors. With the added intelligence microprocessors bring, ADI monitors provide a wide range of signal compatibility. Giving you and your customers more flexibility for your money.

Now is your chance to join up with the first company in Taiwan to produce IBM compatible 14" monitors – the first to offer a full range of microprocessor controlled multi-frequency monitors. And a company that always puts you first.



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MicroScan 3G	14"	0.28mm	30-57KHz	1024 x 768(NI)
MicroScan 4G	15"	0.28mm	30-64KHz	1280 x 1024
MicroScan 5A	17"	0.26mm	30-64KHz	1280 x 1024

Safety approvals: UL, CSA, IEC, TUV/GS, NEMKO, SEMKO, SETI.

EMI approvals: DHHS, FCC Class B, VDE, FTZ, MPRII, CISPR 22.

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*We welcome comments and suggestions. Send correspondence to APC Readers' Say, PO Box 37, Sydney, 2001; or by email to 5653911@MCIMail.com. All correspondence becomes the property of APC and is subject to editing.*

# Readers' say

## Users should not pay for support!

I wish to be one of the first of many to register my disgust at Microsoft's plans to begin charging for product support.

As a software developer, I have had many occasions to contact Microsoft Product Support. Not because I cannot read manuals or use online help, but because of countless bugs and inadequacies in Microsoft's manuals. Usually, the answer at the other end of the phone is a "I'm not quite sure" or "I'll have to check that". The longest I've had to wait is four months — and counting — for Microsoft to sufficiently respond to a serious bug I've pointed out.

Why should I pay up to \$200 to point out to Microsoft that there is a bug in their software or because its manuals are useless? If it is Microsoft's contention to stop those annoying users with their bugs ringing up with their complaints, well it's on its way.

If a user of one of my software products rings with a serious bug, they are not charged and are usually sent a fixed version of the product. If they do ring with a general enquiry they are charged a realistic price, but not a \$200 charge. Maybe it's true what many people say: small busi-



nesses looks after its customers better than big.

Microsoft, learn a lesson!

**Cameron Donnelly,  
Software One**

## Picture of a potential software pirate

With software piracy rife around the world, and myself being a part-time programmer, I have — or at least used to have — a great deal of sympathy for the hapless programmers whose hard work is purloined by the unprincipled pirates found everywhere. The story behind [my change of heart] is annoying indeed,

and it's no wonder that software piracy, in Australia at least, is rampant.

Several weeks ago, I purchased my very first commercial software game, not previously having felt the need or coming across a game that I just had to have. I purchased this game from a large retailer and took it home, firing up the 486 immediately.

There were eight disks and I followed the installation instructions (I tell a lie, I just put the first disk in the disk drive and typed 'install' — well, don't we all?). First disk, fine. Second disk, the dreaded 'error reading drive A,

Abort/Retry/Fail' message; the disk was faulty! Okay, fine, I've paid for the product; check out the warranty.

It said: These disks are warranted from defects for the first 90 days after purchase. Enclose the disks and a cheque for \$7.50 is US currency in a mailer and return to California.

What? I pay \$80 Australian for a piece of software and to get a copy that works I have to fork out about another \$15 Australian (plus postage and whatever for airmail because by surface post the disks would take months to get there and back). This is just not right. I check for an Australian address — none. It's the weekend and the store is closed by now so I can't take it back, and besides it was the last one they had in stock.

Now I gird my loins and do what few other people would dare (well not really, but it sounds good). I look carefully over my shoulder to make sure no one is peeking, carefully slip the write protection tag off and fire up my favourite utilities. Eureka! In 15 minutes I have a readable disk. I now make a copy of all the disks and start installing. Disk 1, fine. Disk 2, no problems . . . all the way to Disk 5, where it dies yet again, this time because of corrupt files.



By now I really have had enough. I put everything away, take the software back to the store on Monday and the salesman says, "Sorry, it's against company policy to refund money on software, I'll order another copy in for you." That's fine as long as I get the software. I go home and wait.

Friday I phone up — not there, it has to come from Sydney — the following Wednesday I phone again — still not there. By this time the salesman is getting worried. Despite company policy, he knows as well as I that I can get my money back; it may just take a bit of extra time. It's now two weeks later; the salesman offers me my money back if I don't want to wait any longer. Very nice of him indeed.

So it's been two weeks and all I have to show for my \$80 is a worried salesman and a receipt. By now I feel like I deserve a copy of the program to compensate for my troubles. Perhaps I should go back to the store, collect my \$80, and then go around to a friend's place for a pirate copy — at least I know it will work. And software companies wonder why some computer users resort to piracy!

**Steve Brooks,  
Westfield, WA**

## Honesty is the best policy

In this day and age of quality assurance, customer service and Total Quality Management, why is it I still encounter suppliers and support people who consider these words sacrilege or expound such virtues in advertising literature, and yet lack the decency to keep you informed when dealing with them?

It is more annoying and frustrating to a purchaser or user to be misled, kept in the dark or lied to, than it is to be told the truth.

What is wrong with your supplier telling you: "It's not in stock locally or ex-East but it should arrive in two weeks," thereby giving you

the opportunity to look elsewhere. Or even, "We only have two in stock. Would you like the rest on back order?" Or a support person saying, "I've received your request but we won't be able to look at it until tomorrow." At least then you would know they received it and you could diarise it for follow-up.

Recently, I ordered two software packages and was under the assumption they would arrive ex-East two days hence, upon which I was told it would be another week. I was then told that they had both items and would get them out to me by courier, and then — sorry, we don't have both items; the second will be another week. Do you want to wait until both items turn up?

No thanks; send the first by courier. It arrived the next day, but when I said courier, I meant same-day — not by camel. I wasted time and money trying to find out the truth about my order.

My purchase should have gone this way: "I'll check availability and get back to you." Then, "Both items are not available ex-East for at least two weeks, do you wish to look elsewhere?"

With the latter scenario, at least I would have been given the opportunity to look elsewhere, but I wasn't. Instead, I was left feeling outraged by the whole event.

My faith in this supplier, whom I have dealt with on numerous occasions over the last six years, has just been totally shattered. Granted, I have had similar incidences with the supplier in the past, but previously I adopted the typical Aussie empathy of "She'll be right" by accepting second-best service.

Slowly, Australians are getting fed up. If, and I mean if, I order from them again it will only be for items that are in stock. Even then I'll probably order the item(s) and end up having part of the order being put on back order without my knowledge or approval.

Suppliers shouldn't lie or mislead their customers. They need to keep them informed

of the facts at all times — something which isn't hard to do and doesn't cost a lot. So what if the customer goes elsewhere; at least you told him the truth and he'll remember that.

Good service encompasses a lot of different things, but if suppliers told the truth and considered how they personally would like to be treated and less about the bottom line, then their clients will keep coming back. Keeping valued customers is what keeps their businesses alive. Ethics and truth are not dirty words.

**T R Warner,  
Gosnells, WA**

## Accounting

I'd like to congratulate APC on the feature, Annual Report: Accounting Packages, in the June, 1993 issue.

You certainly took on a difficult task by covering both high-end, multiuser packages and single-user, small-business packages. All-in-all I thought you did a good job.

Our package, M.Y.O.B., was one of only two small-business packages covered. The rest were very much high-end packages, aimed at much larger businesses. I was a little disappointed, therefore, that the prices of the respective packages covered weren't listed in the summary table. M.Y.O.B. has an recommended retail of \$495, whereas most of the others sell for between \$2500 to \$10,000.

I feel it's important to have this information in a table of features as it will be a key consideration for most readers.

Just a couple of other minor omissions from our part of the table — M.Y.O.B. does have Order Entry and Fixed Assets. It's also important to note that the user base we provided of 7000 was for Australia only, and not for the whole world as with some of the others.

Congratulations and keep up the good work!

**Brad Schofer,  
Marketing Director  
Data-Tech Software**

**Keeping valued customers is what keeps their businesses alive. Ethics and truth are not dirty words.**

## Fractals

I was delighted by the response to the June 1993 Two Bits Worth column by Kester Cranswick, which mentioned the fractal compression products my company in Ferny Creek, Victoria is distributing in Australia. Your readers seem to have a high level of interest in innovative solutions to storage problems.

However, in his column, Mr Cranswick gave the impression that Iterated Systems might be making available a public domain utility that would enable users to view .FIF format files on their computers.

While I know this would encourage the spread of the .FIF format, the licensing conditions under which we distributed Iterated Systems' products, such as Images Incorporated 3.0, do not allow us to distribute such a file viewer without charging a licensee fee.

I have raised the matter with Iterated Systems in the United States, and will continue to pursue it. However, at this stage, if readers wish to use the .FIF format, they will need to either purchase a compression and decompression product, or, if they are developers, incorporate .FIF format capabilities into their applications, using Iterated Systems' Tools programming tools.

**David Porter,  
Managing Director  
Iterated Systems**

# WHO IS REALLY

MAKE	MODEL	BENCHMARKS						WARRANTY
		PC Bench V7.01				Win 3.1 800x600 256 colours	QBench V1.21 Data Access Time	
		DOS Mark	Processor	Memory	Disk			
IBM	PS2 Value Point SX33	*	*	*	*	*	#	*
		22.06	7.83	5.60	19.97	9.4	18.1ms	12 mths
COMPAQ	Pro Linear 4/25S	23.11	6.41	4.40	24.14	8.0	14.1ms	3 years (1 yr O/S)
DELL	425 S/L	21.35	6.26	4.39	21.48	3.1	14.3ms	12 mths
ACER	Power 486s Model-20	20.62	5.90	4.27	20.93	3.1	16.1ms	12mths
IPEX	486SX33 VL	21.35	6.26	4.39	21.48	11.9	14.3ms	3 years
TP	486 SX/25 VL	20.16	6.51	2.59	22.49	2.3	16.2ms	3 Years (RTB)
OSBORNE	486 SX/33V	28.13	7.43	5.39	30.06	13.4	13.9ms	5 years on-site

\* Higher figures shows better performance

# Lower figures shows better performance

## HOW PERFORMANCE WAS MEASURED



## WIN A FREE PC

We were curious about the claims being made by various suppliers both in their advertising and to prospective clients so we went out and purchased the latest 80486SX products from Acer, Compaq, Dell, IBM, IPEX and Total Peripherals and pulled them apart both physically and technically. We examined the components used, the actual component counts for the various subsystems, which component suppliers, production dates and quality classes had been used in each of these systems. We also benchmarked each system using impartial benchmarks supplied by the US publication, PC magazine, PC labs and hard drive suppliers Quantum and Core International. The results of these tests may surprise you, they certainly surprised us. If you are thinking of buying a PC in the near future you should perform a similar comparison to the one we have carried out using your own benchmarks. If you would like a copy of the benchmarks we used, simply contact your nearest Osborne office and they will be happy to tell you how to obtain a copy of the benchmark programs, either from us or the authors.

If you would like the more detailed analysis of any of these systems we carried out including full specifications, chip counts and all of the benchmark results simply attach your business card (or your name and address) to this advertisement and send it to the address on the below. Write the name of the PC you would like to win on the back of your card. We will draw three winners and send them the PC of their choice by the end of September.

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\*2 mb RAM instead of 4 mb RAM

\*SVGA card instead of accelerator

\*120 mb disk instead of 170 mb

you will very soon regret your decision and either put up with inadequate performance or pay much more than your initial "saving" to actually get what you really need. An Osborne system is built without any compromises so that you will actually pay much less over the "lifetime" of your computer than if you "saved" a few dollars on your initial purchase.

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Each Osborne system is factory loaded with a full set of operating systems and application software that has been balanced and optimised to run as quickly and efficiently as possible. We provide the very latest versions of Windows and DOS as well as the very latest versions of Lotus 1-2-3 (multimedia) spreadsheet and Ami Pro - the easiest to use and most fully featured Windows word processing system. The on-line help files and tutorials use the power of multimedia to teach even a novice to become quickly proficient. All of the software has been properly loaded and integrated with the hardware to give you a complete system, not a mish mash of bits and pieces.

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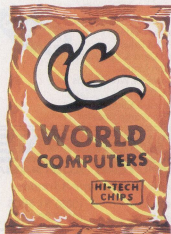
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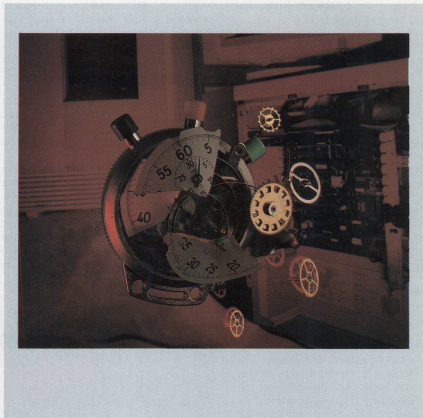
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# The Pace of Change

*The results of APC's third Service and Reliability survey were revealed in the July issue. In this article our research consultant takes a closer look at the replies and reveals some stunning facts about the pace of change in the computer industry.*



**W**e all take for granted the fact that every time we pick up a computer magazine it will be filled with announcements of new products and major technological breakthroughs. The pace of change is nothing short of breathtaking and we can easily forget how far the industry has come.

We all occasionally reflect on the first computer we ever owned and remember the excitement, and frustration, it brought with it. Our ideal dream machine of that time has, in many cases, already been and gone.



BY GEOFF ISAAC

*Back in May 1990, the first 486s burst onto the scene and were considered very powerful and expensive. By November the same year, only 0.5 per cent of respondents to our first survey (published July 1991) were saying they had a 486 PC*

The whole IT industry is built on, and embraces, change. We are now taunted with DEC chief, Robert Palmer's vision of the future: a mightily powerful desktop system incorporating voice recognition, telecommunications, voice synthesis, optical character recognition and messaging. A vision that will, undoubtedly, move from the science fiction of our childhood to reality well before the end of the century.

Getting a grip on this rapid pace of change can be difficult; the whole industry is geared toward the future and the past is quickly forgotten. The last three Service and Reliability surveys have given us a snapshot of the equipment APC's readers were using at given points in time. An even closer look at the equipment in use has revealed some amazing facts.

APC's readers are, in the main, involved with PCs at work. The high proportion of technical content of the magazine does not appeal to the novice user. Most users treat a PC like any other electrical or mechanical device; a black box which performs certain functions that make life easier for that particular person.

I labour the point to highlight the fact that APC readers are the elite of Australia's PC users. By definition, the equipment they are using is highly likely to be more powerful than the average equipment in use by the typical end-user. APC readers are innovators; they are always eager to try out new equipment and rapidly adopt anything that can improve efficiency.

This 'bleeding edge' experience gives a firm insight into the directions the mainstream Australian market will take in the near future.

## PCs

Chart 1 gives an analysis by processor type of the PCs most frequently used by respondents to the Service and Reliability survey.

In November, 1990, we conducted the field work for our first Service and Reliability survey. Less than four out of every 10 of the readers participating in our poll were using a 386SX, or above, machine.

By February 1993 (when we conducted the fieldwork for the third survey) that proportion had increased to four out of five readers (83 per cent). Most significantly, a quarter of the readers responding to our third poll were using a fully fledged 486.

At the start of 1992 many research suppliers were predicting massive growth in the sales of 486SX-based machines. Research conducted among the readers of Computer Publications' titles showed that the 486SX was not destined to make an immediate significant impact on the Australian market.

Competitive price reductions by Intel on fully fledged 486 processors, combined

with a demand for more power, made the DX the chip of choice. By February, 1993, users of 486SX-based machines accounted for just eight per cent of the sample.

However, market research company IDC's Graeme Penn argues that demand for machines based on the 486SX only gained momentum toward the end of 1992. IDC figures show the 486SX accounting for 45 per cent of the 486 market or 13 per cent of the PCs sold during 1992 (see Chart 2).

386DX-based machines now account for just under three out of every 10 PCs used by APC's readership. Although this figure is up significantly on the 1991 finding, (22 per cent) it is down, slightly, on the 1992 finding of 29 per cent.

Similarly, 386SX machines accounted for almost exactly one out of every four machines included in this year's survey. In 1991, SX-based machines accounted for just 15 per cent of the sample, while by 1992 that proportion had almost doubled to 28 per cent.

These findings suggest the 386 market has matured and will be moving into decline very rapidly, if not already. The innovators of the PC market have moved on from this level of processing power.

As mentioned above, the market for machines based on anything less than a 386SX is all but dead. In November 1990, 286-based machines accounted for four out of 10 of the PCs being used by the sample (41 per cent). Fifteen months later that proportion had decreased to one in four (26 per cent) and a year later it had halved again (13 per cent).

The demise of the XT is equally dramatic. These basic machines accounted for over one fifth of the 1991 sample (22 per cent). By February 1992 that proportion had decreased to less than one in 10 (nine per cent), and by February, 1993, XTs accounted for less than one in 20 of the machines in use (four per cent).

Chart 2 summarises the PC market by processor type as monitored by IDC. This chart therefore represents sales and is NOT a summary of installed base. In total they estimate 486 machines accounted for 33 per cent of the 1992 non-Motorola demand, with SX-based machines taking 15 per cent of the PC market. By February of 1993 we found only eight per cent of APC's readers to be using a machine based on the 486SX processor.

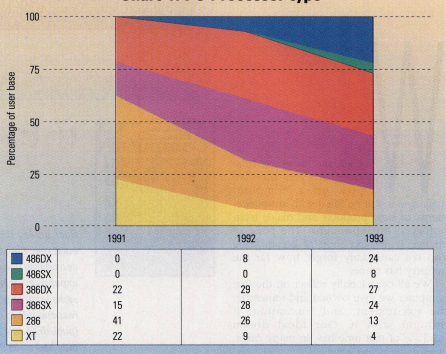
That the leading innovators of the PC market should be significantly less likely to use 486SX machines appears strange.

Our survey found almost equal proportions of 386DX and SX users while IDC estimates well over twice as many SX machines were sold during 1992. In total, 386s accounted for 61 per cent of Intel-based (or equivalent) PC sales while our survey found 51 per cent of users to be using a machine with equivalent power.

IDC's 1993 projections do not include a breakdown between SX and DX processors as the distinction between the two is, according to IDC, becoming too blurred to enable accurate monitoring. 486-based machines (and above) are set to account for nearly half of all PC sales during the current year.

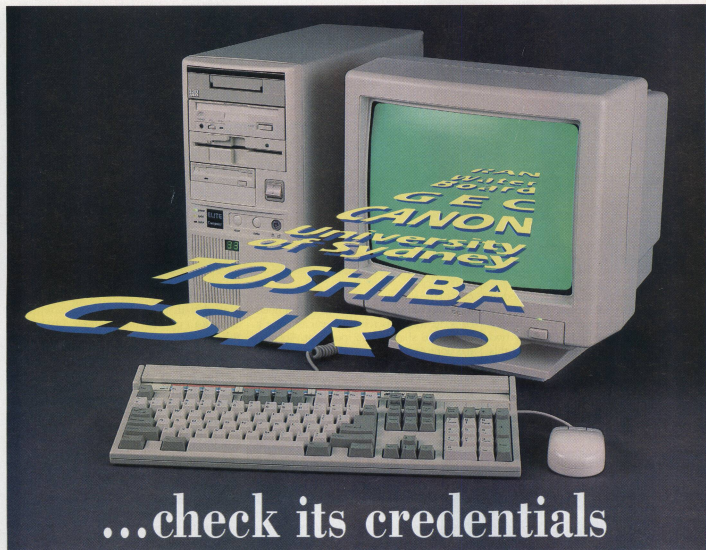
The turbulence in demand for different

Chart 1: PC Processor type





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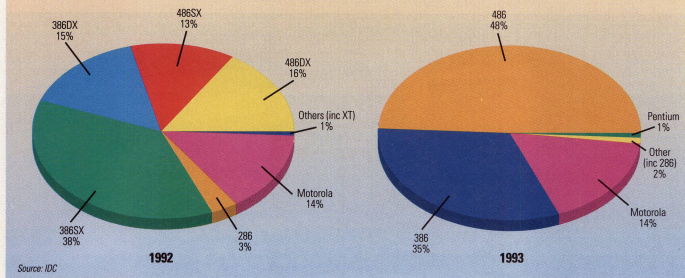
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Chart 2: PC shipments by processor type



levels of technology has been reflected in changing brand preferences. Of the five companies to be represented by the largest number of responses in 1990/1 only two remained in the top five at the start of this year.

Impressively, one of these companies is an Australian assembler, Total Peripherals. Ranked fifth in 1991, with replies making up 4.2 per cent of the sample, Total Peripherals climbed to second place (of the

cent of the sample. In 1992 Toshiba slipped to fifth position (4.5 per cent) but climbed back to fourth place this year despite a decreased share of 3.2 per cent. Toshiba has done exceedingly well to hold on to this position despite the rapid increase in the number of (usually significantly cheaper) competitors entering the portable market.

Of the original top five, IBM, Amstrad and NEC have fallen from grace. In the current survey, IBM ranked seventh with a 2.4 per cent share, down from first place in the 1990/1 survey with a 7.5 per cent share.

Amstrad ranked one place above IBM this year (sixth) with a 2.8 per cent share, compared with second place in 1990/1 with a 6.4 per cent share.

In our initial survey, NEC started off in third place with a 5.3 per cent share that decreased to 4.2 per cent in 1992 and is now running at just 1.9 per cent, ranking this vendor ninth.

Of the three newcomers to this year's top five by volume, two are local assemblers; Osborne and Optima. Osborne's growth has been nothing short of phenomenal; replies from Osborne users contributed just 3.1

per cent of the sample in 1990/1, steadily increasing to 5.1 per cent in 1992 and 7.6 per cent this year.

Replies from people using Optima PCs were too insignificant to measure in 1990/1. By 1992, Optima users made up 2.2 per cent of the sample (ranking the vendor eighth by volume) and this year they represented 4.7 per cent of the sample, sufficient to rank this local assembler third.

Compaq completed the list of the top

five vendors by volume this year. Compaq ranked sixth in 1990/1 with users representing 4.1 per cent of the sample. Last year the company was fourth with 4.6 per cent of the sample and, this year, Compaq ranked fifth with three per cent of the base.

MicroArts is also worthy of mention, coming from nowhere in 1990/1 to contributing nearly two per cent of our sample this year.

For the record, IDC estimates 1992 top vendors (excluding Apple) to be: Osborne (8.4 per cent), Total Peripherals (5.9 per cent), IBM (5.3 per cent), Commodore (5.3 per cent), Ipex (5.1 per cent), Compaq (5 per cent) and Optima (4 per cent).

Over the three years the Service and Reliability survey has been conducted, overall satisfaction with PCs and after-sales support have improved. Well over four out of five respondents participating in this year's survey (82.8 per cent) said they would buy again from the same manufacturer, up a significant 5.4 per cent from 1990/1's rating of 77.4 per cent.

Overall reliability increased from 8.2 (out of 10) to 8.6, while just over two-thirds of this year's sample had need to contact product support (66.9 per cent), compared with three-quarters of the sample (74 per cent) in the first year.

The ease with which product support was obtained was rated at 8.0 this year compared with 7.4 in 1990/1, while satisfaction with product support increased from an average of 6.9 to 7.3. Similarly, satisfaction with repair services increased from 6.8 to 7.3.

## Monitors

Of the three markets looked at in the Service and Reliability survey, the monitor

**Over the three years the Service and Reliability survey has been conducted, overall satisfaction with PCs and after-sales support have improved.**

DOS boxes) in 1992, with replies representing 6.8 per cent of the (DOS using) sample. This year's performance stabilised; Total Peripherals ranked second with replies making up 6.7 per cent of the sample.

The other manufacturer to remain consistently in the top five (by volume of response) is Toshiba. This portable specialist started off ranked fourth in 1990/1, with replies representing 4.8 per



market has undergone the most significant changes (see Chart 3).

In November, 1990, just five per cent of the APC readers participating in our survey were using a SuperVGA monitor. By February 1992 this proportion had increased to over four out of 10 users (42 per cent). By February 1993 two-thirds of the readers participating in our survey were using a monitor of this standard.

In 1990, only 15 per cent of the sample were using a VGA (or above) monitor; by the start of this year that proportion had increased to over 90 per cent of respondents.

VGA monitors peaked in 1992 with nearly four out of 10 readers reporting they use a monitor of this standard (38 per cent). This proportion represented a dramatic increase from the 10 per cent of readers using a VGA monitor in 1991. By the start of this year the proportion of readers using VGA had decreased to exactly one quarter of the sample.

EGA and mono monitors have all but disappeared over the last two years. EGAs were in use by half the sample in November 1990 (49 per cent). By 1992 that proportion had decreased to just nine per cent, and by the start of this year only four per cent of readers were using a monitor of this standard.

One third of readers were restricted to mono monitors at the end of 1990 (34 per cent). By 1992 that proportion had decreased to eight per cent, and is now running at an insignificant three per cent.

Despite the dramatic changes in the technology adopted by the market, one vendor has remained the indisputable leader in this field. In contrast to its performance in the PC market, NEC has held onto its share in the monitor market, starting off with a 14.3 per cent share in our first survey, decreasing to 11.4 per cent in 1992, and steadying at 11.2 per cent this year.

The only other vendor to consistently remain in the top five was Total Peripherals. Ranked fourth in 1991 with a 3.5 per cent share, Total Peripherals finished this year ranked third with 5.5 per cent.

IBM, Amstrad and Compaq have all slipped in successive surveys. IBM started off ranked second in 1991 with a 6.6 per cent share, in the latest survey they ended up 12, with 1.7 per cent.

Amstrad ranked third in 1992 with a 6.1 per cent share, decreasing to 2.1 per cent this year, sufficient to rank this vendor seventh. Compaq started off ranked fifth in 1991 with a three per cent share and ended this year's survey ranked eighth with two per cent.

Leading the newcomers to this year's top five was, of course, Osborne (bundling rebadged Philips monitors with its own

PCs). In 1991, users of Osborne monitors made up just 1.4 per cent of our sample. By 1992 this local assembler had scraped into the top five with 3.3 per cent of replies, and this year Osborne ranked second, with users representing 5.7 per cent of the sample.

Another local assembler, Optima, made it to the top five this year. With replies representing 3.3 per cent of the sample, this year Optima made it to fourth place, up from 1.8 per cent last year (and eleventh place). Insufficient response was received to monitor Optima's performance in the first survey, 1990/1.

Philips completed the list of new entrants to the top five vendors. Users of Philips monitors (distributed exclusively by Clear Technology) contributed 2.3 per cent of our sample size in both the first two Service and Reliability surveys. This year that proportion increased to 2.7 per cent, sufficient to rank the vendor fifth.

As with all sections of the survey, service and reliability scores for monitors have, on average, improved slightly over the three years of polling. In our first survey, readers awarded their monitors an average of 8.8 points (out of 10) for overall reliability. This year that average increased to 9.0.

In 1990/1, 82.9 per cent of respondents said they would buy another monitor from the same manufacturer — this year that proportion increased to 85.1 per cent.

The proportion of respondents requiring product support fell from 24.6 per cent in 1990/1 to 17.5 per cent this year. The ease

with which product support was obtained was stable (7.5 versus 7.6 in the current survey), while satisfaction with product support fell slightly, from 7.1 to 6.9. Repair service satisfaction increased during the same period, from 6.4 to 6.8.

## Printers

Changes in the printer market during 1992 were significantly less dramatic than in the previous year (see Chart 4).

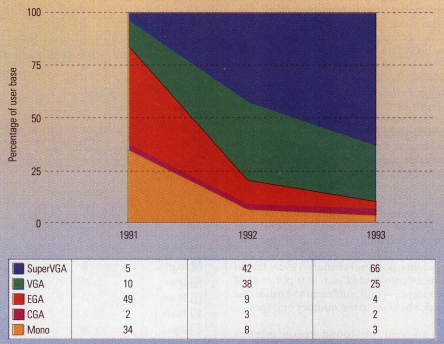
In November, 1990, non-impact printers accounted for one quarter of the installed base (26 per cent). By 1992 this had increased to 45 per cent, with the launch of Canon's Bubblejet helping double inkjet market shares.

By the start of this year, non-impacts' share of the installed base was still hovering just below the halfway mark, at 48 per cent. Laser printers actually lost a little ground, accounting for 30 per cent of the installed base (down from 32 per cent) while inkjets continued their enviable growth pattern, accounting for nearly one fifth (18 per cent) of all printers in use by APC readers.

At the bottom of the spectrum, 9-pin, dot-matrix printers accounted for nearly four in 10 of the printers in use at the end of 1990 (36 per cent). By 1992 this had decreased to less than one in four (23 per cent), but that figure stabilised in the following year's survey (22 per cent).

Similarly, 24-pin printers accounted for 37 per cent of the 1990 installed base among APC readers. By 1992 this propor-

Chart 3: Monitor type





tion had fallen to 30 per cent, and again stabilised over the next 12 months.

IDC estimates that sales of laser printers increased by 13.2 per cent in 1992, an increase which is not reflected in our findings. However, IDC also estimates laser printers satisfied just 19.1 per cent of the

**Many users, including myself, must find the wide carriage tractor feed facility of impact printers indispensable in their day-to-day work.**

demand for printers during the 1992 calendar year (and absorbed half the dollars spent on printers).

It is significant that the quality of output requirements from the innovators of the PC industry appear to have stagnated. Although newcomers to the market may well embrace non-impact technology (especially with the likes of Osborne frequently bundling inkjets with their PCs) survey results indicate that the current output requirements of power users are being met.

Many users, including myself, must find the wide carriage tractor feed facility of impact printers indispensable in their day-to-day work.

The continued price reductions in the low end of the non-impact market and the increasing affordability of colour output devices should invigorate the pace of change in the market over the next year.

Four of the five vendors identified in our first survey as having the largest installed base have remained near the top of the league by volume. Impact printer specialist, Epson, took the lead in our first survey with replies from users of these printers contributing 27.7 per cent of the installed base.

As would be expected from our analysis by printer type, it was 1991 that saw demand for Epson slump. By the time we surveyed for our second Service and Reliability poll (in February 1992), Epson printers contributed just 18.9 per cent of the sample — still, sufficient to ensure this vendor held on to the number one spot — just.

This year we found Epson printers were still in use by 17.7 per cent of the

readers participating in our research. However, Epson's share of the installed base would now appear to be neck-and-neck with non-impact specialist, Hewlett-Packard.

Hewlett-Packard started off in the Service and Reliability Survey in third place (by volume) — replies in 1990 represented 10.3 per cent of the sample. By 1992, Hewlett-Packard ranked second with an 18.3 per cent share, and this year the company topped the league despite share decreasing slightly, to 17.8 per cent.

Another victim of the swing away from impact printers would appear to be Star. In the 1990/1 survey Star ranked second by volume with replies representing 11.9 per cent of the sample. By 1992, this proportion had decreased to 8.5 per cent and Star's ranking fell to third. This year, Star ranked fourth despite its share remaining stable, at 8.4 per cent.

As with the PC section of the survey, NEC has failed to remain a favourite among APC's readership. Ranked fourth in 1990/1 with a 9.1 per cent share, NEC fell to seventh place in 1992 with a 5.5 per cent share. The company ended the 1993 survey also in seventh place with a 4.4 per cent share.

Panasonic has consistently improved performance (as measured by volume of

response) despite fluctuations in overall rankings. Panasonic ranked fifth in our first survey with 4.9 per cent of replies, sixth in our second survey (5.7 per cent), and fifth in the current survey (7.4 per cent).

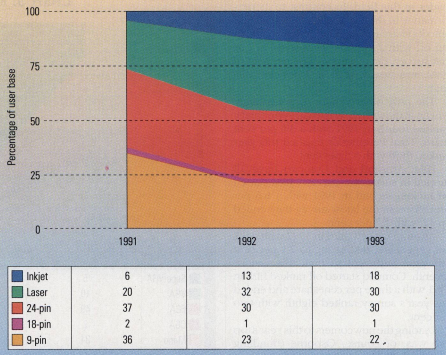
Also enjoying improving market share is Canon. The success of the Bubblejet range has seen this vendor improve performance from seventh place in 1990/1 (3.9 per cent) to fifth place in 1992 (6.4 per cent), and third place this year (12 per cent).

IDC estimates the top laser printer vendors to be: Hewlett-Packard (34.1 per cent), Texas Instruments (7.7 per cent), Epson (6.8 per cent), Lexmark (5.9 per cent) and Gestetner (5.4 per cent).

Over the three years of surveying there has been a slight improvement in the scores awarded by users of printers. In 1990/1 overall reliability was rated at 8.8 (out of 10) and this year the average score increased to 9.0. In the first survey, 87.4 per cent of users said they would buy again from the same manufacturer, while this year that proportion was 88 per cent.

Just over a third of the 1990/1 sample (33.9 per cent) had contacted product support, and that proportion decreased to 31.5 per cent this year. The ease with which product support was obtained was rated at 7.4 in 1990/1, and 7.5 this year. Satisfaction with product support was rated at 6.9 this year against 7.0 in the first survey. Repair service satisfaction increased slightly from 6.4 to 6.6.

**Chart 4: Printer type**





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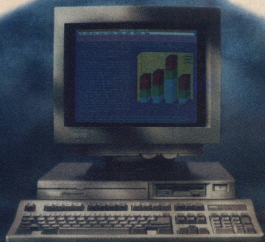
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BY JEREMY WHITE

# Digital Revolution

**I**n determining whether multimedia's benefits are illusory, it helps to remember the arguments that once slurred the advantages of a graphical interface.

Windows is now generally acknowledged to improve productivity. It is not simply because it is a more attractive or consistent environment than DOS, although both these are true. The benefits are less obvious, and arise from the ability the environment provides to easily move and integrate different forms of information within different applications. The GUI is an enabler for this. The most obvious difference between character-based and graphical interfaces — attractiveness — is not the most important.

Much the same can be argued with multimedia. While adding sound, flashy animations and video clips to a PC makes working more enjoyable, the real gains are less obvious than the aesthetics.

On the most basic level, you can stick a sound card and CD-ROM in your PC and voila, multimedia. Your applications go bang and pop, you can add some voice annotations to your spreadsheets, play some great games, and add short movies and D-Generation Late Show skits to your word-processing documents.

If that's all you see multimedia as, however, you're missing the point. When you explore a CD title such as the San Diego Zoo's *The Animals!*, or Microsoft's *Encarta*, you're seeing the sparks of both the future of publishing, and the future of television. And you're seeing it on your PC. Now.

*There's more to multimedia than pops and whizzles. It may take years or decades, but digital convergence has the potential to revolutionise human interaction.*

*In this month's feature on multimedia — or more accurately, digital media — we examine some hefty topics, including the future of television and magazine publishing, Australia's software export industry, and the specifications for high-level multimedia production PCs. So before we start, let's make one thing clear — multimedia is fun. This stuff puts the zing back into your PC. More importantly, it's an enabling technology for the convergence of computers, telecommunications and publishing.*



## Multimedia, new media or digital media

Multimedia, in the artistic sense, refers to combining different forms of media in the one object, mixing, for example, bark, oil paints on canvas, and clay to create a work. With computers, instead of 'multimedia', you really have an entirely new form of media—digital media, capable of handling a variety of information sources—video, text, sound, and static images. It's a new way of delivering information.

A medium is an agent, or, in this context, a delivery mechanism for content. That content might be a colour photograph, a video clip, a speech or diagram, and the delivery might be via projection slides, a glossy colour magazine, a video cassette or TV program. In all cases, the content and media remain separate, if related, entities.

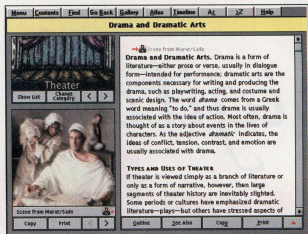
Different media are suited to particular forms of information access. Books can't display motion video and TVs aren't suited to browsing through text or researching specific topics. You can't see Merv twitch his moustache in a newspaper, or hear Gough's Kerr's Cur speech in a reference book. You can't jump to a particular scene in a video of *Hamlet* by looking for its page in a table of contents, nor watch every episode of Murphy Brown containing a reference to Dan Quayle. You can't even browse through the evening television news like you do a magazine, just watching the stories that interest you.

Paper-based texts allow you to focus on particular areas of interest, to browse at your own pace and use cross-references and indexing, but they are static by nature, and unsuited to collecting, collating and targeting particular items. It's difficult to search for every reference to Mabo in a three-month stack of daily newspapers. Television, on the other hand, is dynamic, but it is a broadcast service with limited interactivity beyond the choice of the station you watch. If you're glued to Wimbledon and want to see the stats on Boris Becker, you can't call them up on screen at your convenience.

The interaction and integration a PC provides means that it is suited to both static information, such as text or pictures, and dynamic information, such as video or sound. Text-oriented PCs are hopeless for browsing, or watching mindlessly, but are good for targeting and managing information, and they offer an unsurpassed level of interaction, responding directly and continually to user input.

Imagine a single unit combining access to these different, currently existing content sources; a PCTV that lets you pick and watch your favourite movies when you want, order pizzas, read through interactive cross-referenced multimedia magazines

and newspapers, buy direct from ads with the click of a button, and access vast stores of online data—cable TV meets mail-order meets multimedia PCs meets CompuServe—all through the one box. This combination of technologies is conceptually simple. Implementing that combination is phenomenally complex.



Microsoft's Encarta is the best taste available of the potential of digital media, with a 'hot' interactive interface

We'd like to tell you that it's here and it's now and sells for \$19.95 from K-Mart and you'll get a set of free steak knives with it. Of course it isn't, and when it is, it will be overpriced and buggy, as new technology always is. The path to its achievement is also far from certain, and there are entire vistas of intellectual property, control and censorship of material that have hardly even been considered.

Then there is the question of usability. As some US commentators have noted, Microsoft can't even design an interface usable by the Western world's most intelligent executives. What is Bill Gates going to design for Homer Simpson? Interestingly, Microsoft's Encarta and Dinosaurs both abandon the Windows CUA interface guidelines, using object-oriented navigation tools, or a 'hot' screen in its place.

This digital media is a new form of medium for delivering content, and its potential impact on civilisation is as great as the introduction of the press, the telephone, the television or the personal computer. It is, in essence, their convergence.

## Digital constellations

In trying to explain digital convergence, it is natural to use metaphors, both because the concepts involved are so extensive, and because their relationships are often confusing. Microsoft's Bill Gates has described the trend toward digital convergence as a gold rush, for example, and Apple's Michael Spindler has described it as a food chain.

Gates evoked the gold rush analogy when announcing Microsoft's intention to channel \$US50 million and 200 employees into research on interactive TV and multimedia. It was partly a response to the flurry of joint ventures and announcements that had preceded it.

There is a sense of irrational impulse and chaos in the phrase, as well as the obvious connotation of promised riches. There are also more subtle connotations. A gold rush implies prospectors and pioneers doing the groundwork, and then either becoming rich themselves or being bought out by larger interests. It's hard also to avoid the sense of 'fool's gold' and get-rich-quick shysters, dirty deals and shonky operators.

The problem, at least from the viewpoint of explanation, is that convergence as a concept, like the changes it is referring to, operates on a number of levels and across a number

of fields. It is a complex of ideas, some evident and others less so, and is difficult to encapsulate with simple points. Analogies are useful as they offer both the essence of a model and a hint of its implications, but they too are limited.

At a basic level, we are seeing the coming together of computers, communications and content. This model is easy to grasp. You're already familiar with PCs, telephones and television. Marrying the three has obviously phenomenal potential, and that potential is practical and easily foreseen.

## The all new PCTV

Interactive television carried by high-grade communications lines, such as fibre-optic cable, will allow you to access 'narrowcast' as well as broadcast television services. This means that you can select the shows you want to watch at the time you want to watch them. You might decide you want to watch Nine's Sunday program at 6pm rather than 9am, or watch the ABC's Lateline the following morning at 6.30am rather than 10.30pm when it's shown. Rather than going to the local video store to hire movies, you'd hire them from the equivalent of Video EZY-Online, and receive them digitally.

Once you have interactivity, though, you gain access to more than a flexible program schedule. The online service Prodigy in the US, for example, is working to develop services for a decoder box for cable-TV being developed by Intel and

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Microsoft, due next year. The idea of the venture is to combine text-based content, such as that available on Prodigy, with video-based content. If you're watching the Ashes, and you want to see the scorecard, or the current bowler's statistics, you'd select the appropriate options using the TV remote control, and the scorecard or player stats would appear onscreen.

Interactivity has even greater potential for advertising. If you have television ads running through a system linked to an electronic information service, such as CompuServe, with electronic shopping or banking, you could pick a box onscreen to buy a product being advertised, or receive more information on it.

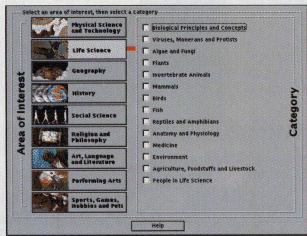
As well as providing an instant response mechanism, narrowcasting offers targeting for advertisers with which a broadcast medium can't compete. Electronic shopping malls could not only show promotional material, but the consumer would be able to search through categories of product and compare specifications and pricing, order more information, or even purchase online. Instead of using clumsy text-based controls, which have hampered traditional online shopping systems, the experience of online shopping would be closer to playing Sale of the Century.

## Electro journalism

Interactive TV is the most common, but it is only one example of potential services. Electronic publishing of newspapers or magazines is another hyperactive area of development. The News in the Future program and others are working to determine standards for electronic delivery. As well as the obvious benefits of consumer-customisation of news, and the cross-reference and research tools available, electronic delivery of news would allow access to far greater amounts of information — current estimates suggest that only 10 per cent of available news is published. Both the Washington Post's *Newsweek* and *TIME Magazine* are now available on CD-ROM in multimedia interactive formats in the US, and *TIME* also posts its stories on Prodigy a day ahead of them hitting the newsstands. The CD versions include interactive advertising, although the scope for exploiting interactivity is limited with this medium. Only when combined with communications is electronic publishing fully realised.

Reading a hypothetical *APC* Interactive, you might call up all related articles on products that interested you, purchase direct from ads, or conduct research of technology topics using concept or keyword searches.

Virgin Airlines has recently announced the inclusion of interactive infotainment consoles on all seats of their flights. These will allow passengers to choose a personal inflight movie from 15 channels, shop duty free, view documentaries and background information on destinations, or play video games inflight. Eventually they will also



Categories are the key to effective navigation, and exemplify the benefits of exploration and using research digital media

allow individual passengers to receive satellite transmissions, send faxes, make phone calls and even send email. Nintendo has announced a similar system for planes and hotels.

Video games are also seen as a boom industry over cable, both in terms of delivery mechanism, and the ability for cross-country interactive playing.

In all of these ventures, it is the delivery of content that is critical. The value of a company like News Corporation or Consolidated Press is not in the paper that its publications are printed on — the 'medium'. The value is in the content. You don't buy a magazine like *APC* or a newspaper like *The Australian* for the coagulation of ink, tree-fibre and glue that the medium as a physical object represents, you buy it for the information it contains.

## Hardware integration

The integration of hardware is encouraging the delivery of this content via digital media. Audio, video, text and graphic images can all be effectively rendered, transferred and displayed in digital form. Digital transmission provides for the interactivity to drive narrowcast and focused services.

These services all rely on an end-user

'box' capable of handling digital media, and a communications infrastructure capable of supporting the digital transfer of information, if necessary in tandem with traditional analogue information. Fibre-optic cable and satellite offer the kind of performance required, and a 386-based PC adapted would provide the computing power required.

The convergence of hardware provides for more than just electronic publishing or interactive television ventures, however. Once you have office equipment, such as photocopiers, phones or faxes working on a network to a digital transmission standard, they can also interact with computer and communications equipment.

This is the focus of the Microsoft At Work strategy, which is being supported by a bulk of office equipment manufacturers. With a digital standard and appropriate interface, a photocopier can be treated like a laser printer, handling large volumes, but with the mailmerge facilities and specialised options you'd have with a conventional printer. The same applies to standard fax machines.

The same digital technology allows you to run your voice-mail system, and handle your incoming and outgoing fax transmissions under the same framework as your electronic mail, and with video conferencing on a LAN, your video mail.

## Odd couplings

No one company is going to dominate this new media, and none are trying to. It is too huge, too complex, and involves too many different threads and developments for any single person or group to track. The research and development required covers a multitude of fields — publishing, broadcasting and cable-TV, fibre-optic networking, satellite, telecommunications, personal computers and digital assistants.

If you were bemused when you heard that Telecom, Channel 9 and Murdoch's News Corporation formed the big-name bid for one of our Pay TV licences, consider what each of these partners offers. Telecom provides communications infrastructure, particularly the capacity for bringing fibre-optic cable to the home and office. Channel 9 and its parent Consolidated Press offer infrastructure, programming, content and delivery expertise. News Corporation offers content, or what Murdoch has termed, 'software'.

It is, nonetheless, a coupling of odd bedfellows, and the same is true of the alliances appearing in the US. AT&T, a paragon of corporate respectability, for example, has coupled with Sierra Online, the primarily games-focused company that spawned Leisure-Suit Larry. Alliances are appearing between companies such as Time Warner



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and US West and Prodigy, Prodigy and Cox news, Apple-Sony-Kodak, and so on.

## Industrial devolution

According to Michael Spindler and Intel's Andy Groves, a change of business model is integral to convergence, and it is this change that we are seeing in the glut of alliances, partnerships and joint ventures both here and overseas.

According to the proponents of convergence, the early computer industry adopted the model of the industrial revolution, based on value chains between supplier and consumer, and a production-line mentality.

Henry Ford's or General Motors' production facilities were fully designed and implemented inhouse. Their design represented competitive advantage. This was the homogeneous model adopted by IBM through to the 60s and 70s, and the wisdom of which was unquestioned.

As Spindler argues, if you ran a Western business, and wanted to set up a computer network, you'd employ the services of a company like IBM. IBM technicians would come into your business, assess your needs, and plan the installation. They'd lay the cabling, install the air conditioners, move in the mainframes and hook up the terminals. They'd configure the operating environment, write all your inhouse software, train your staff, and then provide your help-desk and consultative needs.

As Kenich Ohmae of McKinsey & Co wrote in the *Harvard Business Review* as far back as 1989, ironically, it was IBM itself that helped to change this model with the introduction of the IBM PC. This represented the Dispersion of Technology, where the success of the PC was driven by a product, 1-2-3, developed by another company, Lotus, and where many of the PC's own components were outsourced.

As Ohmae notes, IBM's success was in approaching the development effort as a process of managing multiple external vendors. This introduced the franchised, horizontal model of the 80s and 90s. Ferociously-competitive vendors settled on subsets of raw standards, and dynamic, small companies providing clever products and solutions, like Microsoft or Dell, became major enterprises. Competition came down to every component and node. Companies like IBM to a degree adapted to this new model, but not completely.

## The food chain

Digital convergence, by nature, requires a different, more cooperative model, in which standards, stability and a complementary infrastructure are critical. This is what Spindler, speaking at a seminar earlier this year at The American Club in

Sydney, termed the 'food chain' model. In a food chain, each entity relies on others within the system with which it interacts, and they in turn rely on it. Together, the combination of all these entities forms an infrastructure. In the case of convergence, this infrastructure is also the basis of a revenue stream, and each company in the food chain owns a part of this revenue stream. No single company has the resources to provide an entire telecommunications infrastructure running interactive cable-TV services, but through alliances and joint ventures, companies with the key technologies required can work together to build an infrastructure that all share.

To illustrate, Telecom might provide the communications infrastructure, which in turn services Optus, which in turn provides

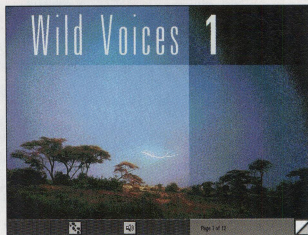
pursue the online information services market with a stake in America Online.

Similarly, Microsoft has been tossing between going into an alliance with an information service, and just buying or creating its own. It is also striving to own the interfaces of digital media. These areas are referred to as core competencies. They provide access to markets and marketable benefits to customers. The trick with alliances is for companies to define their core competencies, and structure their businesses so that these are represented in the food chain, rather than trying to market specific products or services.

Most of the interesting work with convergence is being done by small upstart companies that have the flexibility to work on long-term or not immediately profitable

projects. Once their work shows signs of fruition, they are consumed by larger organisations. Larger organisations may conversely set up smaller companies to develop specific technologies.

According to Gary Hamel from the London School of Business, writing in the *Harvard Business Review*, Japanese companies have for some time worked on a key technology partnership basis, generally referred to as 'Keiretsu'. Each company in an alliance will take out a three to five per cent equity stake in the others, so that they show a financial interest, but do not appear to



*The Animals! is both informative and visually stunning. The concept of biomes is also extensible to the whole field of convergence*

another part of the infrastructure. CompuServe might provide some of the Interactive TV services available, and News Corporation with NEDI might provide the text of *The Australian* online. Consolidated Press might provide both cable TV services and interactive magazines. Spindler argued that a company like Lotus might earn \$25 in the US for selling a copy of 1-2-3. This was a one-off sale, that then often would require support and further customer service. His cable TV company back home, on the other hand, charged him \$69 a month for a service he never even used. Which, asked Spindler, was better? To be getting two per cent of that \$69 a month from lots of people, or \$25 once off from a few?

## Core competencies

'Owning a revenue downstream' is Apple's objective with the Newton PDA. Newton is of primary importance in the long term as a delivery mechanism for information. Apple, as an example, is also attempting to

threaten exercising control.

According to Hamel, as early as the 1970s NEC had realised that its core competencies lay with the convergence of 'C&C' or computers and communications, and it structured its business to match with particular emphasis on semiconductors.

Twenty years later, Western companies are finally seeing the advantages of convergence and core competencies. The dominant names in publishing, telecommunications and computing are manoeuvring and allying to position themselves for a digital convergence. None are sure of the time-frame, or even the results, but there is a sense in these industries that the technologies required to enact revolutionary marvels in the access and distribution of published content are nearly in the family home and office block.

These digital constellations, in which technologies and business models are closely inter-related, promise to deliver what no single company ever could — a digital revolution.

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# Multimedia — A corporate strategy for the 90s?

BY HELEN DANCER

**M**ultimedia-enabled must rate up there with 'workgroup enabled' as the buzz words of the year; certainly these two technologies rate among the most radical shifts in the computing paradigm over the last decade.

The evolution of sound and video-enabled PCs is not new in the Macintosh environment, but for a long time has not been considered a serious business requirement. The rise of business-oriented multimedia content, however, and a growing interest in multimedia, has spurred both software and hardware manufacturers to look at the serious requirement for multimedia on the desktop.

Toshiba began to look at meeting the market for multimedia in the portable sector over 18 months ago, according to Toshiba ISD's David Henderson. The company has recently released the T6600C, a portable with a built-in video board and microphone connector, an indication that the company anticipates that the corporate world is planning to take multimedia very seriously.

"We perceive two significant niche markets for multimedia in the corporate environment. They are training and presentations; both of which are portable in nature. At present Toshiba is the only significant player in the portable multimedia enabled machines area."

But will multimedia-enabled portables be a significant market for Toshiba? "Because it's what a large enough number of our customers, and portable users at large are wanting in a PC, we have to regard it as significant. But as a percentage of our revenue, no, probably not, not yet anyway."

It is in the field of business productivity software that multimedia is emerging as the surprise packet, after having so long been considered the province of games and

recreational devices. Too often the paradigm of 'think multimedia, think Nintendo' has got in the way of applying meaningful multimedia adjuncts to 'serious software'.

That is about to change, according to Lotus Australia's managing director, Steve King. "Where multimedia becomes meaningful in the arena of business productivity tools, where Lotus primarily concerns itself, is where it enables a message to be more fully expressed. For Lotus, that takes two forms; one is in our being able to provide interactive help inside our business applications, to improve the way people relate to our products, and the second is enabling people to communicate in a more audio/visual fashion with each other. Further down the track, we are looking at being able to add video into documents as just another data type, using object oriented architectures."

Multimedia learning tools are already included in 1-2-3 for Windows, with an interactive tutorial which has animation and sound to more properly explain the features and resolve difficulties users have with their software, and which is intelligent enough to relate to the particular set of circumstances which are on the screen at the time the help function was selected.

The ability to treat video objects just like any other data object will be built into a server version of Lotus Notes expected for release later this year. It will offer, according to King's early advice, the ability to view and sort video information within a document. This means that companies dealing in consumer products for example, could store a database of television commercials or radio commercials and retrieve information on when each had been run, what the target market was, and what success rate had been achieved. Each of the segments

could be retrieved and played, and compared, and because they are stored digitally, the time taken to assess the benefits of each would be significantly reduced.

Another scenario is the ready storage of expert presentations. It will represent the difference between reading a document and actually being able to see and hear the expert talking about his field, according to King, and he reinforces that learning is much more effective when graphic visual and audio elements are employed, than in reading alone.

Lotus has also announced that it will participate in the joint development between PictureTel, IBM and Intel, to bring video conferencing to Lotus Notes. Tiny cameras and audioman sound-capture devices attached to each PC will enable each user to plug into other people's conference calls and 'meet remotely'.

"It's a capability, rather than something on which we expect wholesale adoption over the short term," said King. "When you consider that the hardware cost is around \$600 per desk, on top of the price of the PC, and then the telecommunications costs on top of that, it's realistic to assume that the people who will really be taking advantage of the capability will be senior executives who now are spending too much valuable time on the phone and on a plane."

Market take-up of multimedia will be akin to that of the adoption of LANs, says King. "We were being told for about four years in a row that this was going to be the year of the LAN, and it never happened, and then all of a sudden, the industry woke up and realised that it had happened, without companies at large saying — watch, here we go, we're about to do it — LANs had become a significant part of the computing environment. Multimedia will be the same. The take-up rate won't happen over a set down period of

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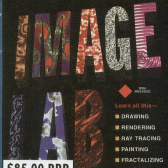
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time, but one day we'll realise that it has happened, and it was just taken for granted."

In the meantime, excited but sceptical, is King's way of describing the market for multimedia. "It has been promised in the industry at large for over three years now. At least here at Lotus we have been saying it was three years away, but I think the time of being able to deliver products is really at hand. Australia has always led the field in the uptake of video conferencing, because of the distances within Australia, and the distances between this country and other business centres. So there's a huge amount of interest, but nevertheless the feedback we are getting is — yeah great, sounds terrific, come and see me when you actually have product to show me. We're on the verge of being able to do that — the next nine to 12 months is going to be very exciting."

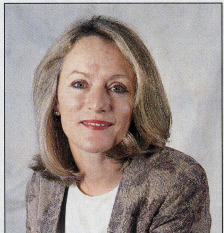
Over that time-frame in Australia, Microsoft hopes to nurture the development of at least two multimedia titles, and transfer the skills honed by multimedia exponents in Microsoft headquarters in Washington State, to Australian companies interested in pursuing the development of multimedia content. The plan is part of a deal announced in June whereby Microsoft corporate office plans to invest over \$40 million in Australian software development, a project which will see the return to Australia of Daniel Petre as overseer. The plan should boost Australia's potential export earnings through innovative software design, as Microsoft will assist local developers not only in design and software development tools, but with marketing and research opportunities.

The scheme will be co-ordinated through the Microsoft Institute of Advanced Software Technology (MSI), which is attached to Microsoft Australia's Sydney headquarters. The Institute's director, Professor Vance Gledhill, says the monumental decision is a recognition of the wealth of talent that Australia possesses in the area of software design and innovation. "It is the first time that Microsoft has allowed any development, let alone encouraged it, outside its home base in Seattle. Multimedia represents a significant opportunity, and Microsoft has already proved that it can produce multimedia titles — it already has a multimedia encyclopaedia and Encarta (Encarta II is on the way), so the developer assistance project is a way of gaining another dimension."

Microsoft will send two product managers from the US who, together with Professor Gledhill, will survey the prospective beneficiaries and choose two projects which will develop into complete CD-ROM titles over the next two years. The aim is to sow the seeds of marketable multimedia development capability in Australia,

hoping to engender a new growth market, one which will, of course, support the popular Windows operating environment. "Mac has been recognised as the friendliest development platform and many content developers do choose to bring titles to market as Mac products, and then transpose them to Windows/DOS versions as a second thought. But now we are seeing the balance shifting, with lots of new products arriving as a Windows version first," Professor Gledhill observed.

The project will 'own' the first subsidised title produced by each of the local developers chosen under the scheme, but the aim of the project is that these developers will then continue to produce



**AST's Terri Darwent: AST is planning bundling packages with its 486 Premia and high-end Bravo PCs, which are all capable of running Video for Windows.**

multimedia titles independently. Professor Gledhill emphasised that Microsoft will hold no equity in subsequent projects, choosing only to instill the capability and step back. While issues of distribution and delivery of products produced as a second generation of this venture remain unresolved, the project nevertheless holds great potential for local developers and would-be publishers to acquire valuable skills in a burgeoning area of technology.

"At the moment, multimedia remains all hype and not enough product," Professor Gledhill maintains. The transitional time-frame he anticipates concurs with King's estimation — nine to 12 months. But the catalyst, he says, will be when every PC shipped will be multimedia enabled, that is, with CD-ROM drives and sound capabilities.

Osborne Computer was the first to ship its high-end PCs complete with CD-ROM drives and CD-based system software and documentation earlier this year, and other companies seem certain to follow suit.


"We are already seeing parents outlay-

ing on a PC the kind of money they used to spend on a set of Encyclopaedia Britannica, because it was good for their kids. When every school has a few copies of Encarta on the PCs around classrooms, then it will become the way of the world, and multimedia will be a natural part of everybody's lives," said Professor Gledhill. Microsoft in Australia will continue to directly address the consumer marketplace as multimedia's largest market opportunity, he said.

The slowness of emerging standards is the factor most inhibiting the growth of multimedia, according to AST's marketing manager Terri Darwent. "So far we have seen a distinct lack of applications which will really drive multimedia into our larger corporate accounts, although video-teletexting may change that over the short term. There is certainly significant benefit to be gained by the wider use of teleconferencing, but companies are reluctant to commit to a product set which may later prove to be incompatible with the tide of products that will emerge. Standards will no doubt be settled on a de facto basis, and we project that over the next one or two years the industry will settle down and decide, probably on installed base, what it calls a standard."

In the meantime, AST is planning bundling packages with its 486 Premia and high end Bravo PCs, which are all capable of running Video for Windows. "The bundled packages will all incorporate third party hardware. AST certainly isn't about to go reinventing the wheel, because there are plenty of fine multimedia-enabling products already in the market and providing those devices is not what we are about," Darwent said.

As a technology, AST is finding that multimedia is showing a slower uptake rate than, for example, PCMCIA card technology. "I'd say every day we have calls from people wanting to know about PCMCIA cards, but very rarely about multimedia. Large corporates know what they need to use multimedia, the just don't know what they can do with it that will be worth all the money they're going to have to spend on it. On the other hand, you don't need purpose-built applications to be able to derive benefit from having a PCMCIA card."

The real transition to a vibrant multimedia-enabled market will come, says Darwent, when the current generation of senior high school students emerges into the marketplace. "When we went to school the idea was that you sat there and listened to what you were told and didn't say much. Today's students are being taught to be much more interactive, to participate and to be more up-front. When we evolve a generation of people who are not shy about talking back, and who don't feel silly interacting with their PCs, then multimedia will see a dramatically higher take-up rate." 



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# Local multimedia developers

## Think Mac, then adapt

BY HELEN DANCER

As a platform, there seems to be little doubt that the Macintosh is the preferred medium for developing multimedia content. PC users are, it seems, though not an afterthought, certainly not at the top of the minds of content developers. With good economic reasons too. The consensus is, it's just too difficult; the Mac environment has one layer to develop to, the PC has two — DOS, then Windows on top. Bad enough that there's the risk of wasting the massive investment in time and resources to develop a product for the Macintosh environment that may or may not take off; worse still to invest significantly more time on the same product to make it work in the DOS/Windows environment only to find that in fact, there is no market.

Content development in Australia is a labour of love, according to the few developers actually making a living out of it rather than treating it as the way they spend their time after working a full day at something which pays properly. In most cases, content is developed on the Macintosh, and converted for the PC environment once a proven market has been established.

That's not to say that there isn't much around, or that what is there isn't good — much of it is superb — or that multimedia isn't a growing industry in this country. Intellectual property rated highly as an export potential for this country among the multimedia exponents and content developers APC spoke to.

In fact, the awareness of multimedia in Australia is proportionally high, according to Graphix Zone director, Glen Johnston. The California-based multimedia developer and training agency recently ran a seminar in Sydney sponsored by Apple Computer. The day-long event, called Jazzed On Multimedia, focused on the practical application of multimedia to business situations, and Johnston emphasised that most people came along just to have the configuration aspects explained to them. "Because it employs other components not

yet recognised as standard parts of a computer, people find multimedia a little confusing. It's reassuring therefore, for them to see a workstation, a Sony video camera and a video board all working together. People need to have the inherent compatibility of the pieces spelled out."

The Jazzed on Multimedia seminar covered 12 cities across America, in London, and both Sydney and Melbourne, and Johnston found that Australians had, in general, an advanced concept of multimedia and its usefulness to their particular purpose. "It's a function of belonging to a newer society. Older cultures take much longer to embrace radically new concepts. For instance, we went to many beautiful museums when we were in London, with not a multimedia kiosk in sight. London is an old culture, it's going to take much longer there than somewhere like Sydney."

Multimedia intellectual property has already been exported to the Graphix Zone in California, in the form of several Australian multimedia exponents who assessed that their career prospects were better served by taking the plunge overseas.



*Long Time, Olden Time was originally printed as a conventional book with a set of audio cassette tapes attached*

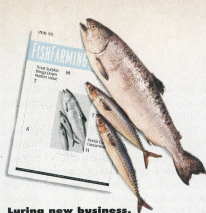
"That was a few years ago, though," said Johnston. "The reality is that now, Australia is catching up fast, and there are a lot of interesting things going on here."

One of the most significant of these is a CD-ROM-delivered interactive 'book' about aboriginal culture and heritage, called *Long Time, Olden Time*. Originally developed on the Mac platform, the CD-ROM book is now available as a Macintosh product.

*Long Time, Olden Time* was originally printed as a conventional book with a set of audio cassette tapes attached. Trying to combine the media of words and voice in a way which would make the information more meaningful and convey more of the atmosphere that the writers intended, failed in a conventional sense, lacking the synthesis of disparate information types, a task which became simple with multimedia.

The book was written by husband and wife team Peter and Jay Read, and based on a series of interviews conducted among people of Northern Australian Aboriginal communities. It documents Australian Aboriginal culture, the cultural heritage of the people and their land, and the horror of the confrontation with and systematic encroachment by white Australia. "The Department of Education commissioned the work, but when they read the contents, and saw the horror of the stories told about the confrontations with white Australians, and realised the implications of their association with the product, the departmental officials said, 'Hmm, maybe not,'" said Firmware Design's Marius Coomans.

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ferred it to CD-ROM format, expanding a little on the material provided, and writing and designing the necessary software to make it accessible.

"The Reads didn't want to take their records of these Aboriginal people's experiences and synthesise them in to a 'Read book' — they wanted the information to stand on its own. CD-ROM-based multimedia enables people to see, to hear and to read, to take whatever parts of the history they want to see, and see them over and over," Coomans said.

"Aboriginal culture is based on an oral tradition, and though multimedia is such a foreign concept to the long tradition of that culture, it's actually quite consistent."

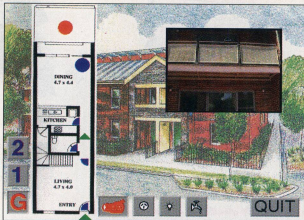
Launched at the Australian Book Fair in June, the CD-ROM title has established Firmware Design a reputation as a provider of first-quality Australian content, which Coomans anticipates will stand both the company and the local industry in good stead overseas. "Our mandate is to take new content, which people have developed, to the stage where they need to market it in order to get some return on their investment. Firmware Design provides both the authoring tools and the distribution and publishing expertise for people who have products they want to sell into the wider marketplace."

The larger part of the company's revenue, he concedes, still comes from providing authoring tools than from supporting and nurturing local content.

That's more or less the impression left from talking to Dof Dickenson, partner in the company Brains, which specialises in producing local content, purpose-designed to suit the Australian school curriculum. "There's a huge export potential in local multimedia content, but it doesn't necessarily mean that the developers stand to make any money."

But the export aspect is not the most important for Dickenson. Philosophically, there are much more important reasons. "If I were looking for a way of making a good living, multimedia content development wouldn't be it. Exporting is the only way we're going to recoup the investment, but that's not why Brains does it."

The problem, she says, is that the majority of content available in schools right now comes from America. And while it may be suitable, it is not necessarily appropriate. "We are getting children, at critical stages of speech development, being spoken to by a computer with an American



While applications such as this real estate front end seem directly commercial, the returns for developers have room to improve

accent. They're getting 'Granmaw an me', and situations they can't relate to, instead of Australian scenes, Australian voices, Australian spelling, and Australian content, which is actually related to the rest of what they're learning. It's essential that children, particularly at that age, but at any age really, have access to material which echoes their own culture. With applications it may be fine to take product from other cultures, but for coursework, it's not fine."

Developers, however, fall victim to the 'small country' syndrome, says Dickenson. Brains started out, she says, with the excellent intention of developing a program for the early teaching of maths. (This beautiful piece of software, called 'James Makes A Salad' will be available as a Mac product later this year.) The title is perfectly suited to Australian children, says Dickenson, but to recoup any of the investment Brains has made, let alone return a profit from the months — maybe years — of work, the program must also be perfectly suited to American children. Thus, developing for

here and then developing for 'out there' is a stronger imperative than developing for Mac, then PC.

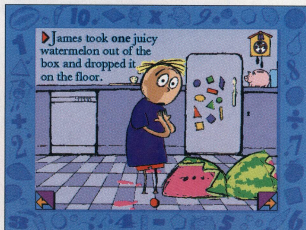
"The bottom line is, unless we sell into the US we'll never recoup our investment," she said. "Developing for the local market, in this case, is really just propped up by the global market; if the broader base for the product wasn't out there, simply, nobody would be able to afford to do it."

Enter the publisher, with an eye for the main chance. And here, says Dickenson, is where developers must beware. The paradigm of writers in garrets making a pittance on brilliant works of fiction while book publishers sell out the first printing and go on reaping the reward with publishing rights in different countries is set to repeat itself among multimedia content developers, says Dickenson, unless people are really aware of their rights, and don't allow themselves to be pressured by the 'big fish/little fish' syndrome.

"The fact is that to be a software developer of any kind, you probably have to be a little bit mad. Nevertheless, Australia is recognised as having world-class programmers, animators and musicians. We're the 3am ponytail brigade, working on a different reality. It's important to understand the greater implications, of how much money the publisher/distributor stands to make versus how much they plan to offer you for your work, and take a firm stand. Otherwise, developers will be absolutely fleeced by people who understand what the work is really worth."

Beware the book-publishing model, says Dickenson. Book publishers are seizing on the market opportunity for this new form of content, but in their struggle to put it in a framework which they understand, they are trying to impose the same rules which apply to the relationship between authors and publishers of conventional titles, a scenario which Dickenson emphasises is entirely inappropriate.

Developers among Dickenson's acquaintance are going up the Windsor Road and having it done right for them by James Steele. His company, Interactive Multimedia, was formed after his own bad experiences with the distribution process and disproportionately low returns on his hard work. He built up expertise publishing and distributing his own title, which describes and explains the Australian system of government and parliamentary representatives, and in turn offers the service



James Makes A Salad: applications developed in Australia must also be suited to the US market

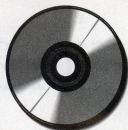
to other content developers wary of being swallowed up by the publishing system.

There are a lot of people in the business of developing content, much of it in the Mac environment, according to Dickenson. Apple recently commissioned Dickenson's company to compile a register of CD-ROM title developers working on the Mac platform, and she says that while the number expected was around 12 or 15, the real figure is closer to 50. It's a cleaner environment, she says, with Macromind Director being the popular development choice. It's easier to do, and that's the attraction, not simply a techie loyalty to the company, although Apple has been very supportive in general, she asserts.

Warnings against exploitation aside, Dickenson reinforces that the commercial advantages to industry in employing multimedia are significant. Corporate customers wanting presentations and training form a large part of Brains' work outside education courseware development, and Dickenson emphasises the benefits of this self-paced, interactive method of instruction. "We can design and build courseware that feeds back into, for example, an Excel spreadsheet which, as well as teaching the program, will compile information for tutors on who logged on, how long each person spent, the sort of problems encountered and the frequency with which they occurred. There's a wealth of information to be gleaned about the education process as well as just the teaching aspect."

Similarly, a company recently commissioned Brains to produce a training simulation which has saved it considerable expenditure. "Before multimedia training, the company had to fly the prospective engineers to France and give them extensive training on the actual computer, making it unusable during that time for any practicable purpose and costing the company heaps. Simulation is a safe and effective learning medium, and it can now even be achieved without leaving the country."

The Mac-versus-PC conundrum is an issue which Dickenson stresses is becoming less and less important. "Delivery is the key, and the choice of computer as the delivery mechanism is really just a 'here and now' thing. That chip or this chip, now, it's not as relevant as it was. I'd say in five years' time the only struggle will be to own the right to send digital information down the pipeline. The carriers, in effect, stand to make the most money, by controlling delivery. There lies the fight, says Dickenson, with developers who understand that the ownership of delivery rights is critical to the success of content development. "Remember the 18 months of development time, the tears and the sleepless nights," she says, "Otherwise, you might as well just go and set up a fish and chip shop!"



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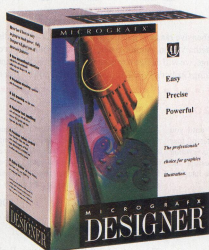
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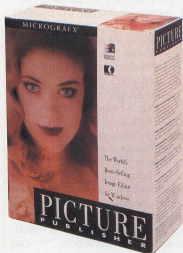


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# BAD Time

BY NATHANIEL TUNBRIDGE

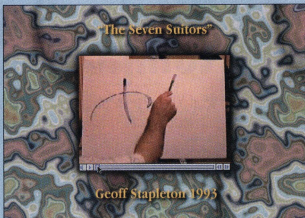
**P**icasso parcelled into a multimedia presentation? That's just one of the ideas proposed by Rob Wellington, Producer with Australian multimedia development company Big Animated Digital Productions (BADP).

BADP was formed four years ago by multimedia wiz Peter Mitchell, who currently shares directorship of the company with Scott McNeillage. The staff currently consists of a general manager and five programmers and artists, and describes itself as being expert in all areas of multimedia production, including sound, graphics, animation, video production and interactive programming. Over the last three years it has been deeply involved with Apple Computer's Advanced Technology Group in the US, developing interactive animation for the simulation of new hardware, computer interfaces and elements of operating system designs.

In 1989 Big Animated Digital was asked to produce animation prototypes of new interface ideas for the Human Interface Group (HIG, a division of the Advanced Technology Group of Apple Computer, in Cupertino, US). These "smart animations" were actually working simulations of HIG's ideas, taken from its storyboards, created using MacroMind Director. Apple was very pleased with this process. "The point is," explained Rob, "we could find out in two days what it takes a team of programmers six months to discover." Rather than make changes to the programming through time-consuming recoding, changes could be made to the functionality using Director. These changes could be reviewed by designers, who would make any necessary changes within a matter of hours. "Once management were happy with the prototype, they could hand it over to the programmers who would code it," Rob concluded.

Both Big Animated Digital in general, and Rob Wellington in particular, regard the computer-human interface design as the most important aspect of any computer. He regards his work as being, in part, the search for the ultimate "intuitive GUI." "A computer should know who you are" he said, "RISC (Reduced Instruction Set Commands) is fine, but we want parallel processing because we want systems that are going to learn."

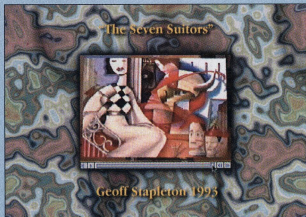
In pursuing this aim, BAD has found that for multimedia production the line between software and software



*"The greatest problem with computers is that they create sociopaths..."*

prototype quickly becomes blurred. As its experience grew in programming development environments such as Director and HyperCard, the company was able to create multimedia 'applications' such as touch-screen kiosks (the company created the kiosk at Australia Post's National Philatelic Museum in Melbourne), interactive software tutorials, and its own custom multimedia editing tools that allow the company to produce and modify software quickly.

Although agreeing speed is important, Wellington sees communication as being the main aim of his work. "The greatest problem with computers," he pointed out, "is that they create sociopaths — people who don't realise that computers aren't people. What we want to do is use computers to help people to communicate."

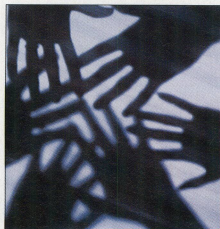


*"... what we want to do is use computers to help people communicate"*

With this in mind, Big Animated Digital is focusing its multimedia talents on two specialised areas; data and training, and CD-ROM production. One of its latest works is BADTIME, a multimedia presentation CD-ROM for Apple US, commissioned by Dr Michael Mills of the Human Interface Group. QuickTime (a piece of system software for System 7) is used mainly for playback of digital images, but BADTIME extends a little on that idea. The CD included an interactive clock, a QuickTime Helper, featuring a live-action model who explains the nature of whichever application the

cursor is currently on, and two examples of what Wellington calls 'navigable movies'. The first of these was attained by placing three video eight cameras at the front of the Sydney Monorail, angled to cover a 180-degree view facing forward. A journey was filmed, and the images stored in an Apple Powerbook running QuickTime. The result seems, at first, to be just a film of a monorail journey playing in a window, but when the user moves the cursor to the left or right, the film that was recorded at that point in the journey is scrolled realistically into the window. It gives the illusion of controlling a live situation, rather than accessing different parts of a recording.

Wellington's mouse has also been active in the art world. He has directed and produced more than 40 rock film clips for artists such as John Farnham and the Models. In 1989, working with Peter Mitchell, he produced a film clip entirely on the Macintosh. It was this work that caught the attention of Apple in America. Lately he has been involved in 'Seven Suitsors', a multimedia QuickTime movie playing out of Director Document, with a looping soundtrack by local Sydney musician, Sean Kelly. The film shows the construction of a painting, from first stroke to last, by musician/artist Geoff Stapleton. "I set up a Video 8 in front of the canvas, and linked it to a Macintosh," explains Rob, "then, every time he did something on the canvas, I got him to take a shot of it. By linking the pictures together, you get an idea of what's occurring during the creative process." As for the Picasso idea, it refers to some film that apparently exists, showing the master at work. Given what he's achieved so far, there doesn't seem to be any reason why Wellington couldn't have this genius at the beck and call of the cursor. "It's possible," he grins. Of course.



# Copyright in multimedia

## Works displayed on computers

John Mackay from law firm Blake Dawson Waldron analyses the hurdles facing intellectual property law with the new media forms created by technology.

**I**ncreasing use is being made of computers for the design, transmission and reproduction of 'artistic' computer-generated images and sound recordings, particularly in the area of multimedia works. Multimedia works combining elements of interaction, text, graphics, animation and sound have a wide variety of uses, including educational tools, sales and marketing pitches and entertainment.

The issues involved in determining the extent of copyright protection for multimedia works are, however, complex and unclear. Whether a multimedia work in itself, as opposed to the computer program which, when run on the computer, produces images and sounds, is copyrightable is a question which has not been considered by the Australian courts. The issue is complicated by the following considerations:

- The fact that the categories of protected works under the *Copyright Act 1968* (Cth) are technologically out of date.
- The problems involved in determining who is the author of the work.
- The issue whether a computer screen display is sufficiently fixed in a 'material form' to be the subject of copyright.

This article examines the legal environment which exists in Australia for copyright protection of multimedia works. A distinction is drawn between the output which constitutes a multimedia work (that is, the computer screen display and associated sounds) and the information which is stored on disk or in another medium and is utilised to produce that output. Separate copyrights may exist in the output and the stored information as well as in the computer program which 'runs' the information and produces the output. This article focuses on the first two copyrights and does not consider computer program copyright.

In order for a work to be capable of copyright protection it must satisfy the

'hurdles' to protection which are dealt with separately below. A work will be protected by copyright only if it satisfies each hurdle.

### Originality

Copyright only exists in certain original works. The main requirement of originality is that the work must not be copied from another work, but should originate from the author. The use of a computer merely to 'replay' video or music will not create a separate work capable of copyright protection because the output is not in any sense original.

For multimedia displays, the issue of originality is particularly important in the context of compilations, or the putting together of material which is generally available and not original in the sense of having novelty in itself. It seems that the expenditure of labour, skill and capital to impart to the product some quality or character which the raw material did not possess will result in a compilation satisfying the test of originality.

### Categories of protected works

In order to obtain copyright protection, a work must be able to be characterised as an original literary, artistic, dramatic or musical work or other 'subject matter' (sound recording, cinematograph film, broadcast or published edition of a work). The strongest possibilities for protection in Australia of multimedia works are dealt with below.

#### Cinematograph film

'Cinematograph film' is defined as "the aggregate of the visual images embodied in an article or thing so as to be capable by the use of that article or thing:

- (a) of being shown as a moving picture; or
- (b) of being embodied in another article or

thing by the use of which it can be shown, and includes the aggregate of the sounds embodied in a sound track associated with such visual images."

Many of the animated screen displays produced by 'new age' automatic visualisation software used in multimedia displays appear to fall within traditional notions of a moving picture. In addition, the definition of 'cinematograph film' requires that the visual images be "embodied in an article or thing." Many multimedia works are stored on disk or CD-ROM comprising material which, when run with a computer program, produces animated images and sounds. It would seem that such material could constitute an aggregate of visual images and associated sounds embodied in an article or thing sufficient to fall within the definition of 'cinematograph film'.

The output produced by multimedia works (that is, the screen display and associated sounds) may also be the subject of copyright protection. However, it seems unlikely that animated images appearing on a computer screen display would be "embodied in an article or thing" for the purposes of the definition of 'cinematograph film'.

#### Artistic works

This category is relevant for images displayed on a computer screen. Relevantly for present purposes, 'artistic work' is defined to mean, "a painting, ... drawing ... or a work of artistic craftsmanship."

'Painting' is not defined and therefore should be approached from the ordinary meaning of the word. It could be argued that there is little difference between a computer-generated picture and the same picture which is generated by the application of paint or pencil to paper and that therefore a computer-generated picture is an artistic work. The English Courts have found, in relation to facial make-up, that a painting must be on a surface of some



kind.<sup>1</sup> If this reasoning is applied to multimedia displays, it would be difficult to argue that the images which appear onscreen are fixed on the screen as they disappear once the computer is turned off. This issue of permanency of fixation is dealt with in more detail below.

The definition of 'drawing', "includes a diagram, map, chart or plan." It is not clear whether the courts would be willing to find that 'drawing' extends to cover a multimedia display. However, the fact that the definition is not exhaustive and the fact that artistic quality is not required under the *Copyright Act* for drawings, indicates that a wide range of subject matter may come within the concept of a 'drawing'.

Works of 'artistic craftsmanship' are treated as 'artistic' only if they have aesthetic appeal.<sup>2</sup> It is certainly arguable that some computer-generated works are the result of the application of skill and taste by the programmer or the operator to the production of images which are themselves appealing to aesthetic taste, and therefore it seems that those images may fall within the definition of 'artistic craftsmanship'.

### Literary works

This category is relevant to multimedia displays which comprise text, graphics and tables and collections of different images as well as scripts for dramatic works and written music. 'Literary work' is defined to include "a table, or compilation, expressed in words, figures or symbols (whether or not in visible form) and a computer program or compilation of computer programs."<sup>3</sup> In order to fall within the definition of 'literary work', the work must evidence sufficient skill and labour to effect a conveying of information, or perhaps instruction or pleasure in the form of literary enjoyment.<sup>4</sup> Written scripts for dramatic works and written music used for multimedia displays are obvious examples of literary works.

While a computer screen display is not a computer program, there is a strong argument that screen displays which comprise text, graphs or tables or combinations of icons, text, tables and interactive images may fall within the definition of 'literary work' as being literary in their own right or as compilations or tables. In relation to compilations, while a simple, unordered presentation will not be protected by copyright, a screen display which exhibits some greater degree of coherence or order that has been imposed upon it by its author may be protected.

### Dramatic and musical works

Choreography and music used for a multimedia display may have separate copyrights as dramatic works and musical works, provided, of course, they are suffi-

ciently original and satisfy the other 'hurdles' to protection dealt with below.

### Is a multimedia display made by a 'qualified person'?

For copyright to subsist in a work it must be made by a 'qualified person' which must be a natural person. 'Qualified person' is defined as the author of the work who is an Australian citizen, an Australian protected person or a person resident in Australia. Whether or not a person is a 'qualified person' is a relatively straightforward exercise in relation to copyright protection of information stored on disk.

However, in relation to screen display copyright, there is an argument that copyright cannot subsist in a screen display created by a multimedia work because the 'author' is the computer or the program (neither of which is a natural person) rather than the author of the program or the operator of the computer. It seems that the answer as to who the author is will depend upon the particular type of program being run.

The roles of the operator and programmer in the process of giving form to the work and their respective contributions of creative skill and effort may determine who the author is. In the case of expert systems, it may be the computer itself rather than the human operator or programmer which determines the output and therefore is the author of the work.

In its Draft Report on Computer Software issued in June, 1993, the Copyright Law Review Committee (CLRC) suggests that the *Copyright Act* should be amended to include a definition of a 'computer-generated work' as one generated by a computer in circumstances where there is no human author of the work. The CLRC suggests that the author of such a work be the person who arranges for the creation of the work, or for whom the arrangements necessary for the creation of the work are undertaken. In many circumstances, whether this person is the programmer or the computer operator may not be clear.

### Is a screen display sufficiently fixed in a 'material form'?

A work must be in a 'material form' to be capable of copyright protection. 'Material form' is defined to include "any form (whether visible or not) of storage from which the work or adaptation, or a substantial part of the work or adaptation, can be reproduced." As discussed above, a separate copyright as a cinematograph film may exist in the information stored on disk or another medium. However, in relation to output produced by a multimedia work (that is, the computer screen display), there is an argument that an Australian court may have considerable difficulty in finding that

the output is sufficiently fixed in a material form to be capable of copyright protection.

It is arguable that a screen display is stored in the relevant object code program and that, with the activation of the program and the aid of the right equipment, it may be 'reproduced' onto the screen. The contrary view is that it is wrong to characterise the display as being 'stored' in the object code program — it is, rather, the end product of the running of the program.

A computer screen display is merely a representation of what exists in a computer's RAM and once the computer loses its RAM (for example, when it is turned off), or changes its contents, the screen display disappears. If 'storage' in the definition of 'material form' connotes a degree of permanency, the transitory display of a work on a VDU may not qualify as a form of storage, and accordingly, the screen display may not qualify as a 'material form'.

In its draft report, the CLRC concludes that screen displays are ephemeral in nature and cannot be regarded as a form of 'storage' for the purposes of the definition of 'material form'. The CLRC notes, however, that the definition of 'material form' is not exhaustive.

## Conclusion

As can be appreciated from the above discussion, what aspects of a multimedia work are capable of copyright protection is a complex issue. In relation to some types of multimedia works, information stored on disk which is capable of being shown as a moving picture may fall within the definition of 'cinematograph film'. However, the situation is more complicated in relation to the screen display as a work in itself.

Whether a screen display is protected will depend upon a number of factors, such as the form of the display and the nature of the computer program used to generate it. It also seems that there is no straightforward answer to the issue whether a screen display is in a form of storage sufficient to constitute a 'material form'.

*John Mackay (BComm, LLB) is a solicitor with the law firm, Blake Dawson Waldron. John specialises in informational technology, telecommunications and media law and has written a number of articles in these areas.*

1. *Merchandising Corporation of America Inc v Harbord Ltd* [1983] FSR 32 at 46.
2. *Merlet v Mothercare plc* (1984) 2 IP 495.
3. s10(1) of the *Copyright Act 1968* (Cth.).
4. *Exxon Corporation v Exxon Insurance Consultants International Ltd* [1981] 2 All ER 495.



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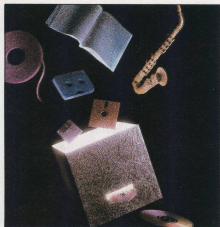
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# Digital media: Here, now and wow

BY HELEN DANCER

**W**hile digital media may well be the delivery vehicle for the electronic publishing and interactive television ventures of the next decade, it does have current practical applications. It also enhances the computing experience. Adding new media capabilities to your PC brings a change of dimension similar to moving from a monochrome to a colour monitor, or from DOS to Windows. The difference is hard to quantify, but it is real and it has a genuine impact.

If you have children, and are interested in PCs in the slightest, forget spending money on *World Book* or *Britannica*. Forget home extensions and putting a pool in the backyard. Go and invest in a Multimedia PC or upgrade kit. The educational potential is phenomenal.

If your work involves presentations or displaying information, or if you're developing training or tutorial materials, then digital media increases impact, and for that alone is worthwhile.

The area where digital media offers the greatest business benefit, though, is for communications. Voice annotations, integrated voice mail and video conferencing feel uncomfortable when you first use them, but they bring to PCs the communicative forms of which they have been all but devoid since inception — those that we use when we're face to face.

Multimedia — or new or digital media — increases the range of material you can deal with through your PC. It adds another dimension to computing, bringing life and music to staid applications. It also brings you the thrill of being on the edge of something fantastic.

## Moving mainstream

### An enabling technology

As with any technology, there are standards for multimedia, in this case the Multimedia PC standard, or MPC. The specification has just been updated to Level 2. Even when the

original was proposed, there were loud grumbles from many that it wasn't meaningful. According to MPC Level 1, a PC could be labelled MPC-compliant if it was at least a 16MHz 386SX with 30M of drive space and 2M of memory, with an 8-bit sound card and a CD-ROM capable of a transfer rate of 155K per second.

Level 2 is more realistic, requiring a 25MHz 486SX with 4M of RAM (8M recommended) and a 160M drive. A 16-bit sound card is required, and your display should be capable of 65K colours at 640 by 480. The CD-ROM drive should be eXtended architecture (XA)-compatible, and 'multisipn' or capable of both 155K per second and 300K per second transmission. XA is the de facto standard for multimedia, allowing compressed video to be interleaved on the CD tracks with audio, so that both can be played simultaneously. This also means you can use the Kodak PhotoCD. To run video, your display should be able to paint the screen fast enough to support 15 frames a second within a 320 by 240 pixel area of 256 colours, with no more than 40 per cent CPU utilisation.

MPC2 should be adequate for multimedia playback, although a cynic might say that with 8M of RAM those specifications are just adequate for running Windows. We'd suggest that if you want to explore this technology seriously, you'll want at least a 33MHz 486DX with 8M of RAM and more than 250M of drive space. If you want to author multimedia productions, you'll need a 50 or 60MHz 486DX2 machine, and you'll want a decent VESA-based graphic accelerator card, a video capture board such as Creative Labs' Video Blaster, and more than 500M of drive space.

If your aims are primarily business-like, the 'not really' MPC-compliant Microsoft Windows Sound System is an attractive option. It doesn't support SoundBlaster or AdLib standards — so no good DOS games — but it lets you add 16-bit sound to Windows for low expense.

There are standards other than MPC worth considering. IBM's Ultimedia series of

PCs is based on OS/2 and the Intel Digital Video Interactive (DVI) system, which allows well over an hour of full-screen full-motion video, or more than 40,000 images to fit on a CD. IBM did not become a signatory to the original MPC standard, but has joined for level 2. Unfortunately, the company declined to provide an OS/2-based Ultimedia PC for this comparison, citing lack of available units. From past experience though, IBM is a serious contender in the multimedia market, possibly more so than any market segment except notebooks.

Intel's Indeo video compression software is also based on DVI. Indeo features automatic processor adaption, to adjust video playback size and speed to the optimal configuration for the processor and clock-speed of the system on which it is running. Intel also hopes to have the successor to VESA as the local bus standard for PC video with Peripheral Connect Interchange (PCI).

### CD-ROMs

CDs may eventually be a dead technology, but until a high bandwidth communications infrastructure has reached critical mass, CDs will remain a durable, cost and volume-effective publishing and distribution medium.

A CD can hold about 680M of data, the new Sony MiniDiscs about 200M. In large quantities they cost only a few dollars to produce. They are robust; they're not subject to magnetic erasure, they don't scratch or break that easily, and are simple to keep clean. Their weight is measured in grams, they're wafer thin in size, and you can post them safely.

As far as computer storage technology goes, they are also amazingly standardised. All follow standard audio CD and ISO 9660 CD-ROM basic formats, and it is only at the vendor-specific layer, almost the file structure, that formats divide. It is increasingly common, for example, to have CDs containing both Mac and DOS versions of software, each sharing the same data from their different executables.

# PhotoCD and the promise of a new image-storage standard

BY ARIAN LEVITAN

**T**he Kodak PhotoCD standard allows 25mm photographs to be stored digitally on a CD-ROM using a special subset of the ISO 9660 CD-ROM standard called Mode 2 Form 1. Up to one hundred photos can be stashed on a single PhotoCD. The images are stored using a proprietary compression format at resolutions of 3072 by 2048 pixels.

Making your own PhotoCD is easy enough. You drop off a roll of 35mm film at the local photo shop and ask that it be transferred to PhotoCD. The photo finisher will take a blank PhotoCD and 'burn' all of the photos into it at one sitting.

This produces a 'single session' PhotoCD. If a PhotoCD is not full, additional photos may be added at a later date. Appending photos to a PhotoCD after the first batch has been stored produces a 'multisession' PhotoCD.

You may not need to buy a new CD-ROM drive to make your system PhotoCD-compatible. All that might be required is an updated device driver. However, even when they're mated with the appropriate PhotoCD driver, most older CD-ROM drives are only 'single-session'-capable. The majority of PhotoCD-compatible drives being shipped today can also read multisession PhotoCDs.

There is a multitude of different CD-ROM formats and specifications, a large number proprietary if popular, particularly Philips' CD-I, and Commodore's CDTV. You're relatively safe ignoring these. There are three specs to note, though, if you are choosing a CD-ROM drive now. Your drive should be XA-compatible as above, multi-spin and capable of 300K per second transfer, and, if you want to use PhotoCD, it should also be multisession.

A data transfer rate of 300K/sec is not that quick, and seek times are slower than hard drives by a factor of ten, ranging from around 200ms to 400ms. Slow speed is the main problem with CD-ROM. The original Yellow Book standard for audio specified a data transfer rate of 155 per second, optimised for audio not data reproduction. The Red Book standard — multispin drives — permits both of audio at 155K/sec and data at 300K/sec.

Even if you're not interested in multimedia, a CD-ROM drive is one of the most sensible investments you can make; you get easy software installation and easy access to large archives.

According to Microsoft's Terry Clancy,

If you're in doubt about a CD-ROM's PhotoCD compatibility or capabilities, check with the drive's manufacturer.

You'll also need software to access and export the images on a PhotoCD into a format that your computer can handle. Eastman Kodak's Access software, available for DOS, Windows and the Mac, gives you a table of contents with thumbnail photos, lets you view individual images, and exports PhotoCD pictures as EPS, TIFF, RIFF, PCX, or BMP files. PhotoCD access software is often included in many multimedia bundles, and you can expect a significant number of programs to support direct import of Photo CD pictures in the future.

Making your own PhotoCDs isn't cheap. A check with local photo finishers offering PhotoCD transfer yielded an average cost of a dollar or more per frame for a full roll of film. The per-frame cost more than doubles if you want to select individual frames from an already processed roll of negatives or slides. On the other hand, PhotoCD allows the casual user to import extremely high-quality colour images into documents and desktop presentations without the major investment required to add a high-resolution colour scanner and/or electronic imaging camera to your computing stable.

while software vendors are not going to force customers to use CDs, it is certainly their preferred choice for distribution. You can bundle an entire suite, such as Microsoft Office, on the one CD; cheaper to produce and package, and easier to install and store. Increasingly vendors place a huge amount of software on one CD, and allow customers to pay by package for a code to 'unlock' distribution, as with Adobe Type On Call, where you pay by font.

## Sound and video cards

Sound boards come in three varieties. Simple business audio and game boards are generally 8-bit, and designed for DOS compatibility with Creative Labs' SoundBlaster or AdLib. Next you have eight and 16-bit Windows-compatible boards, designed for adding pings and pops to Windows, and for Business Audio. The third category are those we recommend for multimedia — 16-bit, offering SoundBlaster and Windows compatibility, with stereo output and recording, FM synthesizers, MIDI support, and a sampling rate of up to 44.1KHz.

Eight-bit sound is noticeably inferior to 16-bit, which is the same quality as a CD

recording. This might not matter if you're playing Donkey Kong, but if you want accurate reproduction, or are going to use your system for presentations or authoring, it becomes critical. So, too, if you expect to use your PC as the centre of a home entertainment system. For the cost differential, there is no question that 16-bit sound is the way to go. As Jim Seymour wrote in *Two Bits Worth* earlier this year, eight simply isn't enough.

Video boards are the most fun you can have on your PC. There is something so impulsively freaky about watching a TV channel or video running in a window under Windows that you quickly become hooked.

Video also offers tremendous potential for communication. Live video conferencing is approaching feasibility, and a system such as NetComm's Cameo provides adequate performance over standard LANs, and has just received Austel approval.

Unfortunately, video files are huge. Compression technology can only do so much, and recording video gobbles drive space. Playback of recorded video is also a real concern. While grabbed video direct from its source runs fine onscreen, capturing that video, and playing it back from your hard drive really hammers your system. Effective onscreen video playback is only generally feasible in a credit card-sized window, which, while it might impress a technophile, isn't going to impress even a three-year-old used to Sesame Street in full-screen motion.

## Software for new media

Multimedia is used to describe both categories of end-user applications, and sets of tools and features that expand the usefulness of existing genres of application.

In the same way that onscreen fonts, graphic images and WYSIWYG have become commonalities with the popularisation of graphical environments, so too will features and tools now referred to as multimedia. You'll think no more of adding a voice annotation to a word-processing document than you do now of adding a text annotation, and it will seem as sensible to place a video clip in a graphics presentation package as to import a piece of clip art.

By nature though, multimedia has appealed to particular software segments, and these have tended to be those that rely on interactivity and information presentation. The coming together of computers and communications is changing this however, and the result will be that multimedia moves from confusion to ubiquity.

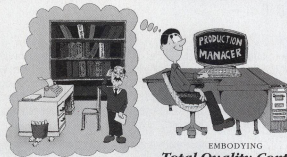
## Communication tools

There are two immediately productive ways of using sound recording in your applications — to talk to yourself, and to talk



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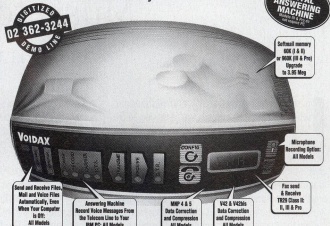
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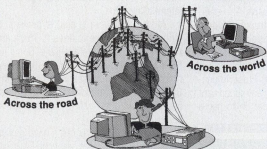
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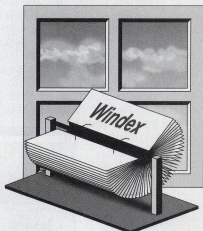
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# Music to my ears

BY PHILIP MOORE

In the realm of computers and multimedia, when we talk about music, we're talking MIDI. MIDI stands for Musical Instrument Digital Interface. This standard was devised by musical instrument manufacturers in the mid-eighties, and was intended simply as a means of allowing one manufacturer's synthesiser to talk to that from another manufacturer. MIDI was not designed with computers in mind, but it didn't take long for people to realise how a computer could really give MIDI the muscle it deserved; and in so doing, create a whole new industry and way of working for musicians.

## Giving your PC MIDI muscle

Aside from the computer itself, there are four basic components needed to get up and running with MIDI — a MIDI interface, a synthesiser, a MIDI controller, and a MIDI sequencer program.

A MIDI interface usually comes in the form of a card that fits into an expansion slot in your PC. There are also external interfaces that attach by cable to the computer's serial or parallel port. These will offer, at the very least, one MIDI In port and one MIDI Out port. You connect a synthesiser to these with special 5-pin DIN MIDI cables.

The interface, in its simplest form, acts as a conduit for MIDI data and functions much like a standard bi-directional COM port, transmitting data to the synthesiser for playback, or receiving data from the synth when recording.

More advanced features that can be included are multiple MIDI In and Out ports, a built-in metronome, and SMPTE synchronisation control. SMPTE sync is important if you want to synchronise your computer with a multitrack tape-recorder, allowing real and 'virtual' computer tracks to play back in unison; or if you want to link the computer to a VCR for composing to moving images, such as when writing soundtracks for film or TV.

The MIDI protocol allows for 16 channels. That means there are 16 distinct pathways that the musical information can be transmitted on, allowing up to 16 separate instrument sounds (or patches) to play at once.

When MIDI was first introduced, synthesisers could only play one type of sound at a time — be it a piano, brass section, kazoo, or whatever. But nowadays all synths are what is called multitimbral. This means they can play several instrument sounds at once, with each sound responding to a different MIDI channel.

With multitimbral synths, 16 channels soon became a limitation, so to overcome

this, the concept of multiple ports was introduced. Each port carries its own set of 16 MIDI channels, and interfaces are available with two, four, or up to eight autonomous ports.

The second main element of a MIDI setup is the synthesiser. This is what you play your music on. As explained, this should be multitimbral, and should respond to all the standard MIDI commands, with a MIDI In, MIDI Out and possibly a Thru port on it. The MIDI Thru port allows you attach another synth to it like a daisy chain, with MIDI information able to pass between all devices in the link (see figure 1).

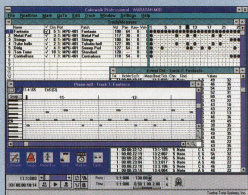
Synthesisers can come in three forms — the familiar piano-style keyboard, a sound module (which is just a synth in a box, without the keyboard), or a sound card (a sound module without a box).

One advantage to using a sound card is that the interface and synthesiser can be combined. If you want it only for MIDI playback purposes, such as for games or Multimedia presentations, this is more than adequate. If, however, you want to record your own music, you will need a MIDI controller. This is something that will transmit MIDI data so you can record what you play.

The most common controller used is the piano keyboard found on a synthesiser, and this is the best choice for most people; but you can also get controller keyboards that have no built-in synth. Also available are guitar, drum, violin, trumpet, oboe, hurdy-gurdy, and even bodysuit controllers for dancers. In fact, anything that can be used expressively could conceivably be used as a MIDI controller.

You only need one controller. Properly configured, it can then be used to play any sound card or module in your setup. If you decide to use a

sound card as your MIDI interface, make sure there is a MIDI breakout box available for it which will provide the necessary Ins and Outs. Some cheaper sound cards do not provide for this. If you want SMPTE sync you will need to get a dedicated MIDI interface, such as the Music Quest MQX-32.



*Cakewalk Professional, one of the most popular MIDI sequencer programs available for the PC*

## Making music

Figure 1 shows just one possible MIDI setup, but there are many possible configurations and ways to add MIDI to your computer. Choosing which method is best for you will depend on what you intend using it for.

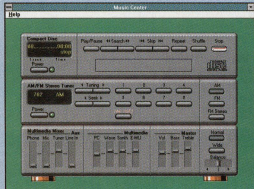
All this hardware is next to useless, though, without the software to drive it. There are many kinds of MIDI software available. Some just play MIDI song files, others can create a song algorithmically for you with a just a few commands. But the most important MIDI program, the one that is at the heart of every MIDI setup, is the sequencer.

A MIDI sequencer is like a word processor for music. You enter notes via your MIDI controller keyboard, which are stored in memory. These can then be cut, copied, pasted and otherwise mangled much as you would text in a word processor.

But of course music is not text, and there are some music-specific functions found in almost all sequencer programs.

Using the metaphor of a multitrack tape recorder, a MIDI sequencer usually has tape-style controls with Play, Rewind, Stop and Pause. It will also use tracks for you to record into, which allow you to build up your masterwork one piece at a time.

These are called virtual tracks and can be played back via any MIDI channel on any instrument sound your synth or sound card is capable of.



*Fig 1: A typical MIDI setup using a sound card/interface and keyboard synthesiser as a MIDI controller*

*Continued on page 119*

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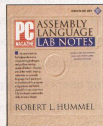
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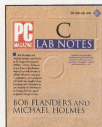
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Continued from page 116

You can even change the instrument after it is recorded and it will play the same notes exactly.

This is possible because what you are recording is not the actual sound but the performance itself. The computer records what notes you press, when you press them, and how hard you press them. It doesn't care what sound was playing at the time; that can be changed whenever you like. The actual instrument sound is stored in the synthesiser itself, not in the MIDI song file.

This is why you can play a MIDI file on any synthesiser, and why it will never sound exactly the same on each one.

### The MIDI revolution

There is much more than a good MIDI sequencer can do to help clean up and alter your music. It doesn't even require great skill as a musician to produce brilliant results. And while you may not realise it, MIDI is everywhere.

The music you hear on the radio and on CD is 90 per cent MIDI-produced these days. Practically every TV show or commercial soundtrack has been produced using MIDI either for the final product, or during the composing/arranging process. Many movies have MIDI musical scores, and you can barely tell the difference between it and a live orchestra or band.

For the beginner, MIDI is not too expensive to

get into. A decent synth/sound card/interface and sequencer program could set you back from one to two thousand dollars, depending what kind of setup you go for. If this is too much all at once you can buy it in stages, starting with a couple of hundred dollars, and still get some use out of it while you save for the next piece. For a relatively small outlay (compared to just five years ago) you can get a respectable home studio capable of producing near-professional-quality recordings.

It gets more expensive if you want to produce music for CD or broadcast release, but still not nearly as exorbitant as it was before MIDI came along. And the best thing is you can do it all from the comfort of your own home.

to others. There is even more potential in the integration of your PC, phone and other office equipment. There are decent voice recognition systems of varying quality already on the market, but they aren't yet sufficiently reliable for dependent use. Both MediaVision and Creative Pacific's Multimedia Upgrade Kits come with two recognition packages; one to control the Windows interface using voice, and the other a speech-to-text converter.

Using the Windows control software in both cases is painful. The text-to-speech conversion works better than expected,

however. There are apparently better systems under development by DEC, IBM and others, but for the moment a keyboard remains first choice for text input.

While you can forget using speech recognition to enter significant blocks of text in the short term, adding voice annotations is feasible. You're going to feel embarrassed the first time you add a voice comment to a spreadsheet, so it's probably best to try it huddled in the study at home. It's a natural idea though, similar to using a dictaphone to record your thoughts, except in this case your thoughts are directly em-

bedded in the material to which they relate.

Under Windows, you insert sound as an object using OLE. The trade-off for the increased speed and convenience of recording your thoughts and comments this way is that sound files take more storage space than the equivalent sentiments expressed as text. Adding a thought while working on a word-processing document, without interrupting your text stream, is useful for reminding yourself of information and for communicating with others collaborating on the same document without conflicting revision markers, or long text discourse.

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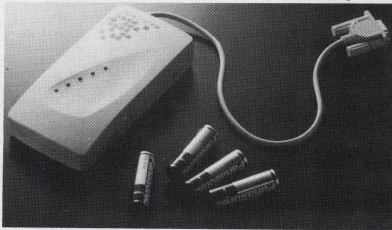
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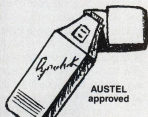
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The input and playback hardware bundled by vendors needs more thought. While it is socially acceptable to chat with your colleagues across desks, or talk into the plastic handset of a telephone, talking in the general direction of your PC, or playing back others' messages through even small speakers is going to annoy coworkers in an open-plan office. Integrated headphone/microphone sets are one possibility, but only if you can access your phone system through them also.

It is this integration of communications and your PC from which the greatest business benefit arises. Digital's Robert Palmer demonstrated just such a converged setup at Atlanta Comdex/Windows World earlier this year, with voice mail and chat, network video, email and phone systems all integrated. NetComm is currently working on a system to integrate voice mail, email, fax and communications services within the one application.

With such a system, you'd open your Inbox, double-click voice mails, emails, even video mails onscreen to play them, dial phone numbers direct from your contact management program, and talk

through headphones while you type. NetComm demonstrated a prototype of such an integrated system to APC early this winter, minus the video, but with hooks into the company's PABX. Microsoft's At Work strategy expands this convergence to include 'smart' hardware level links between fax machines, PCs and photocopiers.

### Electronic publishing

There are some superb electronic references now available on CD-ROM. Although the mix of text, graphics, sound and video available in varying degrees in these packages is appealing, it is their interactivity, and their cross-referencing and navigation tools that make them interesting.

Microsoft Encarta, the best of many encyclopaedia style references, will blow you away with its style, scope and depth. You can look through Encarta alphabetically, or using text-based searches. Far more powerful, though, are categories. These allow you to focus on broad topic areas, narrowing your criteria within that area and moving between related items.

When you call up an article, you are not only presented with reasonably thorough

material, often 10,000 or more words in length, but with related pictures, sound clips, animations, maps and diagrams. Hypertext links to related articles are dotted throughout the text stream, including bibliographic references, and a See Also function. The program offers a media Gallery, an interactive Time Line, game and tour.

Microsoft's Dinosaurs sports an even better interface. The quality of the images, the design, and the integration of cross-references and exploration tools is incomparable. Everything is linked, and the package is designed for exploration. A 'Hot' screen, allows you to work your way into greater and greater depths of material, moving on the fly between related topics, helped by tour guides, documentary videos, time lines and galleries.

Another great example of online reference material is the San Diego Zoo's The Animals! CD. When you start the application, you select different environments from a quasi-terrain, such as Savanna, or Rainforest. This calls up series of articles and fact sheets, along with relevant photographs, maps and sound clips. You can explore the Zoo, invoke different

## Video under Windows

BY DAVID LIN

**M**ultimedia was always going to be a lost cause until one element was in place — and that came at the end of 1992 when Microsoft released the specs for the AVI (Audio Video Interleave) and Video for Windows.

There had been numerous products preceding VFW — capture boards, frame grabbers and compression boards, but what we had with VFW was a standard. Scalable video of a sort is now available as a software-only solution. I make this qualified statement due to some inadequacies in the technology. The Amiga has been the platform of choice for DTV development for some years now. Apple's QuickTime/System 7 has had teething troubles, but the signs are there that the dark ages have past, while the enormous potential in the PC area is awaiting.

Samples of digital video are punctuated by disappointment — inability to manipulate realtime, full-screen, full-motion footage. Technically, the problem lies with the fact that most PC systems just do not have the I/O capabilities to stream huge volumes of analogue data in the form of video and audio, through the digital PC medium at realtime rates of play. Conventional I/O subsystems are just too slow. Your efforts at DTV on your standard 386 or 486-based ISA machine with or without an ac-

celerated VGA card will typically run at best in a window 160 by 120 pixels in size, at 15 frames per second (PAL TV runs at something close to 30 fps) with a paltry 236 colours (20 colours out of a palette of 256 in 8-bit colour are used by VFW). You can try and tweak this to a higher resolution but installing VFW will usually result in the software being intelligent enough to figure out what configuration works best for your system's capabilities and any meddling will result in degraded performance.

Developers strive towards producing codecs (compression/decompression) algorithms which will squash the physical size of the captured video files, video (and audio if this has been enabled) that has been taken from its native analogue wave form into a digital format and streamed into a digital storage medium like a disk or RAM. The methods used vary on a theme of eliminating static data between frames. The trick behind the idea here is to not compromise image quality too much when applying the decompression on playback. VFW ships with three codecs with various properties. Newer, more efficient codecs are being shipped all the time.

On the hardware side of things, activity is more divergent. One area of development is the integration of codec technology into processor chips such as the well-regarded Intel i750 chip, which is the basis of many of the more sophisticated capture

cards. Another important area of development is a holistic approach to improving throughput overall in delivery systems like faster drives or caching controllers that can buffer data while the processor is still catching up with previous frames, bearing in mind a successful video capture usually involves employing a drive with 12 ms or better average access time.

Considering the current overheads with running scalable video on the PC — ideally a Pentium machine with a caching controller and a VGA card with 2M of VRAM and accelerator on the local bus, plus a fast, fast and faster SCSI drive of at least half a gigabyte of contiguous space spare — we are a long way from seeing full-motion, full-screen video in the multimedia mainstream.

Having said that, systems of more modest proportions and capabilities can still deliver sophisticated multimedia, incorporating elements of video production without too much pain. Video on the PC and Video for Windows are here — they are available now. It works in spite of the shortcomings, it is here to stay and will develop and mature. What it will take is a combination of user acceptance, users taking a look at how best to use the technology, and a best-case mix of hardware and software capabilities for DTV to make that quantum leap into the mainstream.



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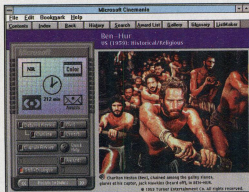
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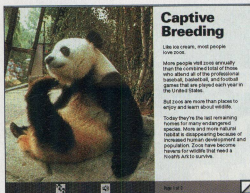
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If you love John Hinde, or even Bill Collins, you'll love Cinemania, Microsoft's encyclopedia of film



Beautiful design and a stunning interface. San Diego Zoo's The Animals!

animals and habitats, watch video clips of them in their enclosures, or call up photos of them in the wild with related texts. There are interviews with Zoo staff, tours, and 'day in the life' segments, such as feeding or closing time.

The interfaces for these products have been completely reworked, and especially Microsoft's titles have abandoned CUA guidelines. Although this sounds confusing, it is in fact a great improvement. Instead of following a flat icon and menu-bar interface, these digital media applications are far more object oriented. Clicking on any object in Dinosaurs, whether a period on a time line, an info-box, or a fossil, will take you layer upon layer into the material.

In the same way that graphical interfaces allowed and required new approaches to interface design, so too these newer media. The good electronic references have a bookish feel to them, but the book is alive.

These works are fantastic for kids — although Encarta is a serious work. The range of educational material goes even further, though.

The Broderbund books, *Arthur's Teacher Trouble* and *Grandma and Me* are fully interactive children's books, where the child can either navigate the story, or have the computer 'read' to him or her. The stories are

brought to life by animated sequences, sound and interaction.

These are highlights of thousands of CD titles, of which a large number have an educational focus. Online guides to NetWare or Windows, or even applications such as Lotus 1-2-3 offer the combination of reference, dynamism and inter-action. Using the techniques of Encarta, it is easy to picture a reference which includes a short video of installing a network card, or highlighting the jumper switches on a modem card.

### Dynamic presentations

Impact is a key element of the popularity of presentation packages. Sound, animation and video are more tools for the presenter to capture an audience.

There is more to the use of multimedia in presentations than impact, though. Motion can be used effectively to illustrate a concept, for example, growth symbolised by growing plants, or to show how a product works.

Sound also allows for presentations to be unhinged from their presenter. You can prepare a series of slides with their own voice-overs embedded. Taking this concept further, you can develop interactive presentations, where the target takes a presentation with them to play in their own

time.

Onscreen buttons allow the user to navigate the presentation in different ways, or gain expanded information on a particular topic.

While you could develop such an interactive presentation using a multimedia authoring package, more traditional presentation packages such as Freelance Graphics for Windows or Microsoft PowerPoint support the insertion of multimedia objects. A package such as Compel takes the capability further, customised for multimedia presentations, with full-motion templates and backdrops.

Using a multimedia notebook, such as the Toshiba T6600C, and a full-colour projection panel such as Sharp's JXP series, you can create and present genuinely dynamic presentations anywhere, combining impact with interaction.

### Tutorials and training

Tutorial and training applications, or courseware, rely on interaction to reinforce the material they are imparting. Incorporating video and animation clips not only increases retention and interest, but allows the author of an application to demonstrate

manoeuvres and procedures that do not translate adequately to static diagrams, or to combine diagrams with motion sequences.

Packages such as MacroMind Action, Authorware Professional, Temptra, or 2-Software Toolworks make inhouse development of multimedia courseware feasible, though not easy.

Interactive training has the advantage that it is self-paced and generally modular. Users working their way through material can go over sections they don't understand in detail, and skip through material with which they're comfortable. They can break off sessions to resume later, and structure their completion of courses according to other commitments.

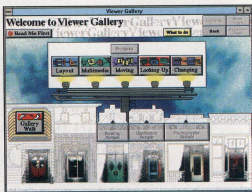
As the courseware is software-based, rather than video tape or reference-text-based, the course can track a user's progress and provide feedback, and even grading and evaluation.

As digital media forms are suited to object-oriented interfaces, and the media forms themselves — animations, video and sound — are familiar, users need relatively little acclimatisation. The combination of these 'natural data types' with interaction and the ability to retrace make multimedia courseware more user-friendly than most categories of software.

### Information kiosks

You've seen these everywhere — from Grace Bros and the local shopping centre to Parliament House in Canberra. Usually placed in a small booth with a touchscreen interface, information kiosks provide simple sets of search and reference tools for finding your way around, or plain browsing.

Often the kiosks are available in PC and Mac versions. The Parliament Stack, for example, from Interactive Multimedia ((06) 259 1980), has background and biography details on all members of the Senate and House of Representatives, including



Most multimedia applications have a Gallery for exploration, including in this case the authoring program



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# AutoDesk 3D studio and multimedia authoring

BY HENRY THOMAS

If there is one thing that all PC multimedia authoring applications have in common, it is that they aspire to marry images with a variety of other media. If a picture is worth a thousand words then the creation of those pictures is at the core of successful multimedia.

In recent years, 3D rendering has become an immensely popular method of generating realistic images with high production values. 3D rendering is a term used to describe the shading process when a computer turns a geometric description of a scene into a photo-realistic image. Its popularity has come from its extensive use by television stations to create stunning station ID advertising segments. It is now used for a wide variety of image visualisations from architectural walk-throughs to special effects in motion pictures.

3D is attractive to the image maker because it is generally easier to obtain professional results by modelling and rendering the image in 3D than it is to draw it by hand. It is also generally cheaper than creating a real-life model and having it photographed in a studio. Many products are designed using CAD (computer-aided design) packages. Design plans created in CAD can be imported into and rendered in 3D. Thus allowing photographic images of prototypes to be used in multimedia presentations long before they even come into production.

AutoDesk, a company well known for AutoCAD, was the first vendor to the market with a commercial off-the-shelf 3D package for the PC. 3D Studio, now in its second release, is a robust professional package, capable of creating images for a multiple of uses including video, motion picture, computer-based multimedia and photography.

As an application, 3D studio feels like a CAD package. You start by modelling objects. These can

be drawn as 2D shapes and then extruded into 3D, or alternatively, modelled completely in three dimensions. There are plenty of powerful model creation features that allow you to sculpt organic shapes including a full implementation of bezier curve geometry. These are curves defined by a line between two points with two other points that act like magnets, pulling the line into a curved shape.

If you have models that have been designed in other CAD applications, then they can be imported using the standard DXF drawing interchange file format. Once you have finished creating your models, you then define their surface properties in a materials editor. This involves defining colour, transparency, texture, opacity, bumpiness and reflectivity.

There are also special effects that can also be applied. One example is a wave creation property that, used on a flat expansive surface in an animation, makes it look like the swell out at sea. To create more complex textures like wood, there is a CD full of scanned textures that can be wrapped over the surface of objects; these include wood, marble and tile patterns.

The final stage is to assemble all the separate object components into a 3D scene, define lights, spotlights, backgrounds, atmosphere and a camera, which represents the point of view. Objects that move in animations are linked together in a hierarchical structure that allows definition of such complex things as the motion of walking. This is all managed by the key frame editor, which allows you to create animation by defining a small number of key frames. You can also do a test render using a faster wire frame or flat shading mode. This allows you to check that every scene is working correctly before you commit to the more time-consuming process of the final render.

Importantly, 3D studio can output directly to the AutoDesk Animator profile (FLC) animation format which has become an industry-recognised standard for animation. The Flc standard uses a proprietary word-aligned delta compression format to store animation. Flc animation files are independent of display device, and contain sequences of 8-bit, 256-colour images that can be created at any resolution.

The delta compression starts by compressing the first frame using BRUN (byte run) length compression. Subsequent frames use delta compression to only record the amount the image and colour palette change between frames. In this way a well planned animation will compress down to a fraction of the size that the sum of its frames would require if they were stored as a sequence of separate image files.

Delta compression also aids the performance of an animation when it is played back. Less data needs to be read from the disk or CD storage device so there are no annoying seek time delays because successive frames are read from a contiguous stream of data. This characteristic makes them ideal for computer-based multimedia development.

Most high-end multimedia authoring packages support the Flc animation format. AutoDesk also has a freely distributable animation player for Windows which allows animations, still images, MIDI, wave and CD audio to be scripted together. The recent release of CorelDraw 4.0 has a presentation component that also supports the inclusion of Flc animation. Corel Show was originally designed to create slide presentations. With the inclusion of animation and sound support it is now geared up for computer-based multimedia authoring.



The Creative Edutainment Pack is hard to beat for \$1099

22.05KHz in stereo. A Yamaha 20-Voice, 4-operator OPL-3 FM synthesiser chip is included on the board for MIDI and effects. The 16-bit version offers a sample rate to 44.1KHz in stereo.

Connections include stereo line-in, a proprietary connector for Creative's own CD-ROM player, a standard joystick port, MIDI interface connector and a standard socket for stereo output. It uses an onboard four watt per channel amplifier/mixer with manual rotary volume control. Using a mixer you can combine five audio sources with a master control for fades, pan, volume, and left and right stereo balancing.

The internal CD-ROM player is a proprietary unit built for Creative by Matsushita (Panasonic). The low-end version in the Pro kit offers slow if MPC level 1

compliant 150K/sec performance with 390ms access time. In addition to sound output through the SoundBlaster Pro card, a headphone socket and volume control are included on the front.

Matsushita's double-speed multisession drives offer noticeable performance improvements, and the possibility of PhotoCD, and, along with 16-bit sound, easily justifies the extra cost of Creative's higher end kits.

The speakers included in the Pro kit are of the small, plastic box type found in many hobbyist stores, and while nowhere near a true hi-fi quality expected by purists, are adequate for 8-bit playback. The 16-bit-based systems include superior shielded speakers, although if you're serious you'll use your stereo system.

## AT A GLANCE

**Creative Labs Multimedia Upgrade Kit**

**Distributor:** Creative Pacific  
**Telephone:** (02) 906 8887  
**Price from:** \$699 to \$1549  
**Specifications:** Multimedia Upgrade Kit (\$699): SoundBlaster Pro Deluxe, 16-bit play and 8-bit stereo recording, Panasonic 155K/sec single session CD-ROM drive, SoundBlaster stereo speakers. Software includes Jukebox, Pro Mixer and Wave Studio. CD titles include Software Toolworks Encyclopaedia, The Animals! and the Introduction to Multimedia. The Toolworks Multimedia Encyclopaedia, The Animals!, Introduction to Multimedia, 16-bit pack, Just Grandma and Me, Sherlock Holmes, Lucas Film Games Pack.

**CD-ROMs:**

A diagnostic program eases installation by identifying potential IRQ conflicts, although you will still need to set these manually. Factory defaults were fine for our tests. An overly long 4cm-wide ribbon cable connects CD player and sound card — annoying if case space is at a premium.

Over 5M of DOS and Windows utilities and applications are included. The DOS applications include Talking Parrot, mimicking anything spoken into the microphone as well as having its own inbuilt, albeit small, vocabulary; FM Organ, allowing tunes to be played and composed via the computer keyboard (also supports MIDI devices), Voice Editor, and various other audio mixing and playback applications.

Windows applications are Jukebox (MIDI playback); Pro Mixer and WaveStudio (a utility for recording and editing WAV files); Soundo'LE (creation and playback of OLE sound objects); Creative Mosaic (a game); and Talking Scheduler, a Diary/Calendar program utilising voice annotation and text-to-speech capabilities.

CD titles include the Toolworks Multimedia Encyclopaedia, which has minimal Australian content, The Animals! (San Diego Zoo) and an 'Introduction to Multimedia' containing references to, and demonstrations of, dozens of multimedia applications plus a comprehensive sampling of sound and AVI files. The 16-bit pack also includes Just Grandma and Me, Where in the World is Carmen Sandiego, Sherlock Holmes and the LucasFilm games pack.

The SoundBlaster cards perform almost perfectly, except that volume levels vary between Windows, audio CDs and DOS-based games. Recording quality varies with the frequency and sample rate, although there were diabolical level problems with

output from a high-powered amplifier. The bundled microphone in the 16-bit kit is also expectedly inadequate, and the slower drive in the Pro kit also had problems with AVI playback. The SoundBlaster Pro version of the Creative Labs Multimedia Upgrade Kit is \$699, and has to be close to first choice among low-end kits. Other kits featuring 16-bit sound (with or without ASP chip), different software bundles, and multisession and multisession CD-ROM drives are priced from \$1099 to \$1549. In our opinion, however, the best value kit is the Edutainment Pack for \$1099.

**Media Vision Upgrade Kits****By Jeremy White**

I have never enjoyed installing hardware so much as the Media Vision Pro 16 System, and there are few packages I've used that have such an instant impact on computing and your enjoyment of it. This puts the razzle back into PCs.

The Pro 16 System is expensive if very good, retailing for \$1799. We also evaluated Media Vision's Fusion CD 16 and Fusion Double CD 16 kits, retailing for \$999 and \$1399 respectively. The quality of Media Vision's products is consistent across the range, and the configurations well targeted.

I installed the Pro 16 System in a Dell 466/L 4/120. It was unnecessary to set jumps on the card for IRQ settings, or even open the manual. Configuration is intelligent and completely software driven, and the full installation of the CD-ROM drive and sound card took less than 10 minutes.

This is one of the first MPC Level 2 labelled kits to be released, and the specifications are impressive. The SCSI CD-ROM drive is a blinder — an NEC 84JD-1 CD, PhotoCD-compatible, multisession, dual speed with a 300K/sec transfer rate and 250ms access time, using a caddy with motorised load and eject.

The Pro AudioStudio 16 sound card —



*Media Vision's three kits are well targeted, and dominate at the high end*

## AT A GLANCE

**Media Vision: Fusion Double CD 16**

**Distributor:** Chips and Bits  
**Phone:** (03) 696 5955  
**Price:** \$999  
**Specifications:** 16-bit sound, Phillips CD 155K/sec, LabTec speakers, MIDI, joystick  
**CD-ROMs:** Comptons Multimedia Encyclopaedia, Where in the World is Carmen Sandiego, Deluxe, Mantis, Civilisation, BattleChess

**Media Vision: Pro AudioSpectrum 16**

**Price:** \$1799  
**Specifications:** NEC multisession dual-speed drive, 155K, 300K, 350ms access time, Kodak PhotoCD multisession, dual-speed, 250ms access, SCSI CD-ROM interface, Voice recognition, audio compression/decomp, 16-bit text-to-speech, Pro Sound Editor, Microphone included, 100 per cent MP2-compatible  
**CD-ROMs:** Comptons Multimedia Encyclopaedia, 7th Guest, Battle Chess, Author's Teacher Trouble

**Pro 16 System**

**Price:** \$1799  
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**CD-ROMs:** Battle Chess, Action 2.5, Carmen, Karaoke, Comptons, Mayo Clinic, Mantis, Civilisation

a member of the series which, according to Media Vision, holds around 85 per cent of the total 16-bit market — uses the Yamaha YM262 OPL-3 20 voice synthesizer, with four operator FM sounds. Updates will incorporate the new Pro AudioStudio 16XL, the first sound card to use sampled-sound music synthesis, with a 32-voice wave-table synthesizer. This incorporates a Korg synthesizer, as well as professional-quality effects such as reverb. While FM synthesizer technology is almost a standard, it lacks the realism provided by digitised instrument reproduction.

Featuring full compatibility with SoundBlaster, AdLib, Windows, MPC and Ultimea, the Pro AudioStudio 16 has a sample rate ranging from 6 to 44.1KHz, with stereo output and recording. A small clip-on or stick-on microphone is included, but while it registered static, I was unable to convince it to pick up useful sound. No speakers are included, it apparently being assumed that you will be using this system

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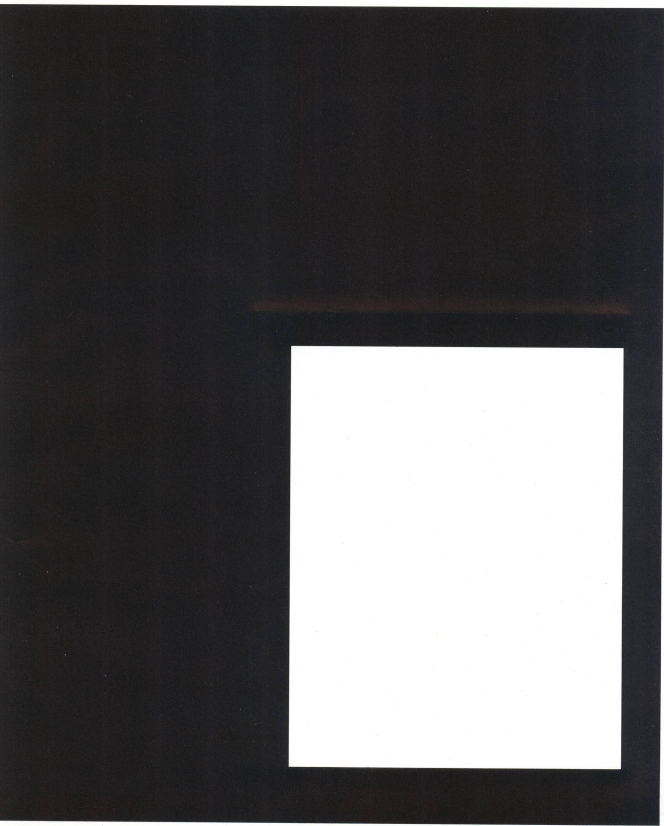




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with a full stereo — it would be wasteful to use this quality of sound equipment with diminutive speakers.

The software bundled includes a voice-recognition utility for controlling Windows, audio compression/decompression, 16-bit text-to-speech conversion, which worked surprisingly well if imperfectly, and the Pro Sound Editor. You also get a Windows mixer, MIDI sequencing software, and other standard startup utilities.

The CD titles include BattleChess Enhanced, the multimedia authoring program Action 2.5, and Where in the World is Carmen Sandiego Deluxe. It also includes the best CD on the market (well, sort of), one that will have your friends flocking around your PC, to a tiffin', PC Karaoke, as well as the games Mantis and Civilisation. Compton's Multimedia encyclopaedia and the Mayo Health Clinic are also included.

The Fusion DoubleCD 16 kit uses a SCSI NEC 551 double-speed CD-ROM drive, with a seek time of 250ms and 64K buffer, which is PhotoCD ready. The Pro AudioSpectrum 16 sound card is bundled with Labtec CS550 Amplified speakers, which were the best of the small speaker systems I've used.

This kit takes a different approach to software. While bundling the same basic Windows sound utilities, the CD titles are Compton's and Battle Chess as for the Pro 16, but then the excellent children's Living Book, Arthur's Teacher Trouble, and the equally phenomenal 7th Guest are included.

The Fusion CD 16 kit offers 16-bit sound, and the same basic software as for the DoubleCD above, but with the significantly slower Philips 155K/sec standard CD-ROM drive, which is not multisession. This kit includes the Labtec speakers, and has Compton's Multimedia Encyclopaedia, Where in the World is Carmen Sandiego, Mantis, Civilisation and Battle Chess.

Unless you intend using PhotoCD (and this is a big unless), this Fusion CD kit is great value. If you intend using video under Windows at all, or intend using multimedia heavily, it's worth the extra for the DoubleCD version. The Pro 16 kit is easily the most powerful of the systems we reviewed.

## NEC CD-Gallery Multimedia Upgrade Kit

By Ben Gerholt

NEC's CD-Gallery really is great. Whether you want multimedia to do high-level authoring, a reference library, photo sampler, or just to impress your friends by controlling your Madonna CDs with your mouse, this package can do it. In fact, while I'm writing this, Kylie Minogue's 'Greatest



*NEC's drives are used in many others' upgrade kits — its own kits are high quality if expensive*

Hits' is playing over the headphones. A somewhat expensive way of playing a \$25 CD, but if you have the technology, use it.

Installing the sound gallery is simple. After slotting in the NEC Multimedia Audio Board, you attach the combination cable and external CD-ROM. There are connections for line-in, line-out, joystick and MIDI devices. Labtec's PC speakers then simply connect into the back of the board.

The CD-ROM drive included is the external version of NEC's top-of-the-line 84JD-1, the MultiSpin 74, offering an access times of 280 ms, a mean time between failure rating of 50,000 hours, a 256K memory cache and support for both SCSI and SCSI-2 on the adaptor. This drive was designed with the Kodak PhotoCD in mind.

Putting the hardware together is easy compared to configuring the system. NEC's setup program wins no user-friendliness awards and I eventually edited AUTO-EXEC.BAT and CONFIG.SYS manually. Once running however, the CD-ROM and sound card combination worked well.

## AT A GLANCE

### NEC Upgrade Kit

**Distributor:** NEC  
**Telephone:** (02) 930 2000  
**Price:** \$1781  
**Specifications:** NEC MultiSpin External CD-ROM; NEC Multimedia Audio Board; Pair of Labtec Stereo CD Speakers; Labtec Stereo computer headphones. Audio combination cable — the connector for the External CD-ROM included cables, joystick, MIDI system and external audio source. Where in the World is Carmen Sandiego — Deluxe Edition; Guinness Disc of Records; Great Wonders of the World; Sherlock Holmes, Consulting Detective; The New Groliers Multimedia Encyclopaedia; Mavis Beacon Teaches Typing.

### CD-ROMS

Included in the bundle is NEC's own acceptable CD-ROM management shell for launching applications. Of the six CD titles, five are DOS-based, providing a reasonable introduction to multimedia. There are two games, the educational 'Carmen Sandiego', which seems to be included in most CD-ROM kits, and 'Sherlock Holmes, Consulting Detective'. I let some friends loose with Sherlock and they were particularly impressed with the extensive use of audio-visual interviews.

In addition to Groliers Multimedia Encyclopaedia and the Guinness Disk of Records, the only Windows program is Mavis Beacon Teaches Typing, an interactive typing tutorial, with speed tests against a racing car and a supermarket checkout that are almost fun.

The downside of CD Gallery is the price tag. At \$1781, it is significantly more than similar systems, although the quality is superb. You can buy the drive alone, but this will still set you back \$1410, on top of which you'll need a SCSI interface and sound card.

NEC has a cheaper multimedia pack known as CD Express (\$1157), but NEC considers it a portable system for multimedia applications on the go. Included in the CD Express pack are 10 CD titles and the CDR-25 — a single-speed external drive.

## Sony Desktop Library Multimedia Upgrade

By Ben Gerholt

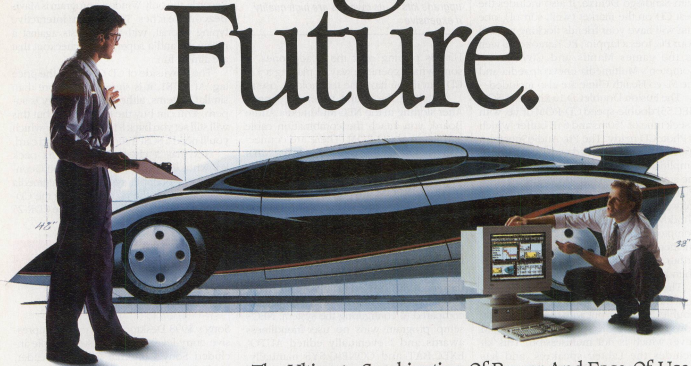
Sony's \$998 Desktop Library is an impressive entry-level kit. The tested bundle included Sony's internal CD-ROM reader, Media Vision's Spectrum 16 sound card and a set of Sony speakers. The bundle includes a number of general CDs, and has support for the Kodak PhotoCD under DOS using the authoring package Tempra.

Getting up and running was easy. The documentation is concise and well organised, with separate guides for the Desktop Library, sound card and GeoWorks. After following instructions to install the



*The Sony Desktop Library is a solid introduction to digital media*

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## AT A GLANCE

Sony Desktop Library  
Multimedia Upgrade

<b>Distributor:</b>	Sony
<b>Telephone:</b>	(02) 877 6666
<b>Price:</b>	<b>Sony Desktop Library</b> as tested (Internal), \$998
	<b>Sony Desktop Library (External)</b> , \$1258 (as above but external drive)
	<b>Sony CD-ROM Starter Kit</b> \$649 (Sony Internal CD-ROM drive, GeoWorks, TEMPRO, Grolier MultiMedia Encyclopedia and Great Wonders of the World, Volume 1)
<b>Specifications:</b>	Sony CDU-31A internal CD-ROM drive — random access time of 550 msec and 64K buffer (150 K/sec.) MediaVision 'Spectrum' MultiMedia Sound Card (16 bit), two Sony Speakers (shielded)
<b>Requires:</b>	Recommended 386 or higher with 1M of RAM, 12M of disk space, VGA graphics and recommends a memory manager.
<b>CD-ROMs</b>	GeoWorks CD-ROM Manager including TEMPRO Access Software for Kodak Photo CD; The 1991 TIME Magazine Compact Almanac; Where in the World is Carmen Sandiego? Deluxe Edition; Great Wonders of the World, Volume 1; The Presidents: It All Started With George; The New Grolier MultiMedia Encyclopedia; Kodak PhotoCD Photo Sampler.

sound board and drive, software configuration is via a simple utility. The CD-ROM management program GeoWorks not only automatically configures and allows easy operation of the included DOS CDs, but provides a full DOS shell with Tetriz, terminal emulation, file management, notebook and preset support for over 30 titles.

The MediaVision Spectrum sound card provides 16-bit sampling at 44.1KHz and delivers high-quality stereo playback and record. It is Windows multimedia extensions Version 1, AdLib and SoundBlaster-compatible, and comes with the Windows accessories Pro Mixer, Pocket Recorder and Pocket Mixer. GeoWorks itself includes a management system for audio CDs. This enables users to enter track and disk information for each CD, including play lists and track order, which are stored on the hard drive and automatically recalled.

While the bundled software is a decent introduction to multimedia, it isn't sufficiently comprehensive to stop you going shopping within a few days. American history prevails, with The Presidents: It All Started With George and the 1991 TIME Almanac. Where in the World is Carmen

Sandiego, a travel-based geography game, can't even get away from that US slant. While running the program I decided to venture to Sydney where I questioned an Australian army officer who suspiciously resembled General MacArthur.

Also on the GeoWorks CD is TEMPRO, a DOS application that allows viewing, editing and exporting Kodak PhotoCD images. Even running the Dell 486SX/25 this package showed up the CD-ROM's 155K/sec transfer rate and relatively poor performance.

For an extra \$260 the kit comes with an external drive and SCSI adaptor with external plug. An extra expansion slot is required for this as Sony doesn't provide an all-in-one sound board and external SCSI connector.

The Sony Desktop Library is a good introduction to the world of CD-ROM. The drive can't match the dual-velocity machines for performance, but is a solid, well built unit. The MediaVision sound card provides top-quality 16-bit stereo sound, the software range is adequate and the Sony shielded speakers are among the best in this range.

Winstorm CD-ROM  
Multimedia Upgrade Kit

By Ben Gerholt

Sigma Designs' Winstorm provides video, audio and CD-ROM components for your

## Logitech hits senses

BY BEN GERHOLT

Logitech markets its products under the banner of 'Senseware'. The company's devices are aimed at increasing the ease of computing and enhancing the overall interaction between user and machine. 'Senseware: Sight, Sound and Touch' products from Logitech include differing mouse configurations, various trackball devices, handheld scanners and, of course, sound equipment.

Logitech's entry-level sound device is Audioman. Designed for Windows 3.1, Audioman: Compact Digital Audio Tool allows recording and playback without a soundcard. It is aimed purely at the voice annotation market arising out of the Windows platform and has a particular emphasis on business users (people in the position where the purchase of a sound card would look more like play than work!).

Installation of the device literally takes a couple of minutes. Audioman connects to the parallel port with a Pass-Through Connector that allows printers to be connected to the end.

It is powered either by two penlight (AA) batteries or a 9V DC power supply connected to a power socket on the side of the Pass-Through Connector. Audioman software in Windows keeps a watchful eye on battery conditions, displaying a warning message upon starting Windows if the power is low.

Using Audioman is extremely simple. Recording and playback are done using Windows' Sound Recorder Utility. I initially expected sound quality to be poor but the microphone works well with voice recording. Playback through the 2-inch diameter speaker is quite good — more than satisfactory for voice.

Audioman is a great tool for adding voice annotation — it is easy to set up and even easier to use — and could be very useful for laptop and notebook users.

Logitech's Soundman 16 goes much further than its infant relative, Audioman, providing full 16-bit stereo CD-quality sound for your machine as well as recording and editing facilities.

The board itself is easy to install in any spare expansion slot and has connections for joystick, microphone, line-in and, naturally, line-out. A 386SX16 or higher PC is recommended in the manual's system requirements. Sound can be easily added to games as the card is fully compatible with both SoundBlaster and AdLib. An internal CD-ROM drive's audio cable can be connected to the board — there are two separate connectors, a four and a 5-pin.

The 15-pin joystick port can be used in conjunction with a Soundman MIDI Adaptor to connect the board to external MIDI devices; this Adaptor does not come with the board. The board's line-out can directly support an external speaker or be amplified and the line-in port can be used to make the audio connections to an external CD-ROM.

Both DOS and Windows utilities are included on the installation disk. For DOS there is the PAS utility, a basic mixer that is not the most user-friendly of programs. It permits play and record levels of inputs to be set as well as master controls for volume, treble and base.

The Windows utilities, Pocket Recorder and Pocket Mixer are common Windows 3.1 applications that ship with a number of sound cards. Easy to use, they are good basic mixing and recording tools.

Two high-quality products from Logitech, Audioman, and more so Soundman 16, are definite contenders in the multimedia field. Soundman 16 meets MPC standards and is a good sound board to use if you intend to limit yourself to sound or intend purchasing a CD-ROM drive not bundled with a SCSI-inclusive sound card.



# Digicorder PC

BY DAVID LIN

**V**oice-mail and messaging is an aspect of computing and office technology that has been around for a quite a while. While it remains a peripheral productivity technology, digital audio continues to grow in acceptance and application without threatening to gain the sort of universal appeal that facsimile machines have had.

The Digicorder VP-870 is one of a family of PC add-in expansion board products that fits into the voice-card category of devices. The kit, from distributors Zenology Sales, consisted of an 8-bit half-length ISA board, microphone, a modest speaker, software and manual. Installation is simple and will in most cases involve no more than plugging the card with its default settings into a vacant slot, loading the software drivers and optionally plugging in the microphone and speaker. There will be instances where installation might involve playing with the jumper settings on the card, but several base memory address and IRQ settings are available to allow for leeway in determining the optimal settings on your PC.

The VP-870 can record voice messages and the demonstration software allows Adlib sound card compatibility, a 'talking' keyboard and some rudimentary multimedia authoring capabilities mixing sound with still graphics. The quality of the

documentation is poorly presented; some of the demonstrations are equally embarrassing unless you speak Mandarin Chinese, which probably qualified me for this review. Still, the VP-870 did not entail any difficulties in operating and the low-level driver interfaces for C, Pascal and Clipper offer some potential for greater deeds.

While operation is not taxing, the VP-870 suffers mainly from the fact that its Adlib compatibility, what I believed to be its greatest attraction, is disabled once your processor's clock speed climbs above 30MHz. Also, its analogue sampling rate is not the de facto standard 11, 22 or 44KHz used by full-featured sound cards on the PC. The saving grace, though, is that being an 8-bit card, XT-compatibles are not precluded from using the product. Basic voice recording is painless and if you can operate an audio cassette recorder you can run the VP-870 family of voice digitisers.

While I would not recommend the VP-870 for a multimedia PC system, due to its inherent limitations primarily from lack of expandability and compatibility, the \$199 (inc tax, postage and handling) price is attractive. For people who require the most basic of digital voice capabilities, or are running on the most modest of hardware platforms, then the VP-870 may be just the product for your needs.

machine. 24-bit hardware accelerated SVGA and 16-bit sound come on one board. This board also has a SCSI connector for the NEC double-velocity (300K per second) internal CD-ROM drive.

Running the CD-ROM installation program on the Dell 486SX25, in which the drive and card were mounted, failed. Although the

installation program had successfully made all the necessary file installations and AUTOEXEC.BAT and CONFIG.SYS alterations, the program's own MSCDEX.EXE file — required for drive recognition — was incompatible with MS-DOS 6.0 running on the machine. The problem is easily overcome by editing CONFIG.SYS to use the MSCDEX.EXE file resident in DOS 6.0, but this hassle should be rectified.

Graphics on the Dell are driven by a local bus Tseng 4000 controller, with a very respectable Graphics Winmark of 13.1 megapixels per second. Obviously using the Winstorm VGA adaptor would significantly lower this figure. After installation of both the board and Windows display drivers for the Winstorm board, the Graphics Winmark returned a figure of 3.99 megapixels per second — not bad for a card of this nature. Out of interest I installed a 512K Oak Technology SVGA card from an old 386SX clone. This card — a dedicated graphics driver that takes a slot by itself — returned a slower Graphics Winmark of 3.2. Graphics can be disabled using jumpers on the card. The Winstorm card offers 16-bit



*WinStorm's kit is similarly priced to NEC's, while not quite matching it for value*

(2KHz to 44KHz) stereo. Sound quality was good, but I didn't feel as confident of the quality as with, say, the Media Vision, although this is hard to quantify. Speakers didn't come with the kit so be prepared to either hook it up to your home stereo or buy some shielded speakers.

NEC's CDR-55 CD-ROM drive, included in the upgrade kit, is a robust dual-velocity drive with a data transfer rate of 300K per second with removable caddy loading.

Interesting bundled utilities include the Musicrack sound system for both audio discs and .WAV files. MIDIbase is a 'front end' manager for storing and playing MIDI files. Asymetrix, a simple multimedia presentation creation program is also included. Pocket Recorder, pocket mixer and ProMixer are also bundled.

Compton's Multimedia Encyclopedia, Kodak's PhotoCD Access Software with sample photos and Where in the World is Carmen Sandiego make up the remainder of the software in the bundle.

If you wish to upgrade to VGA, and save yourself a slot, this kit may be worth considering. The dual-velocity MPC-compliant NEC CD-ROM drive is a quality performer and the software is well targeted for newcomers. At \$1940, however, it is similarly priced to the NEC CD Gallery without really matching it for value.

## AT A GLANCE

### Winstorm CD-ROM Multimedia Upgrade Kit

**Distributor:** LakoVision  
**Telephone:** (03) 525 2788  
**Price:** \$1940  
**Specifications:** NEC dual-speed CD-ROM, Winstorm Multimedia Display Adaptor — sound, 1M VRAM Graphics and SCSI interface, Compton's Multimedia Encyclopedia, Kodak's PhotoCD Access Software and sample photos; Where in the World is Carmen Sandiego? Deluxe Edition; Multimedia Accessory CD-ROM.

## Multimedia PCs

### Acer AcerPAC 150+

By David Lin

Multimedia has suffered as a label for technology that promised to deliver but failed, lacking the integration needed for true utility or convenience. Acer has designed one of the more complete answers to date. The AcerPAC 150+ has been slow arriving due to a long Austel approval process, but offers practical, well integrated benefits —

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Floppy Disk Drive	1.44MB	1.44Mb	1.44MB
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VL-BUS IDE	NO	YES	NO
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<b>SUPER-5</b> VL-486DX2-66 <b>\$3,815</b>	SPECIFICATION: 4MB memory (expandable to 64MB), 1 x 3.5" Floppy Drive, Maximum 4 drive bays, ISA expansion slots, Super VGA Colour Monitor (1024 x 768), Local BUS VGA, Local BUS IDE card, Mouse, DOS 6.0, Windows 3.1 COMPARISON: Compaq Deskpro 4/33 - \$4,195 • Dell 433L - \$3,895

\* All prices (CST, Compaq & Dell) are list prices as at March 1993

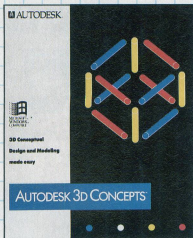
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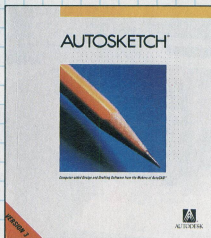
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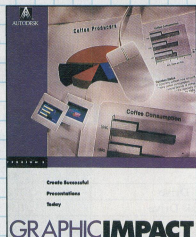
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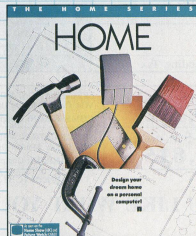
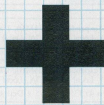
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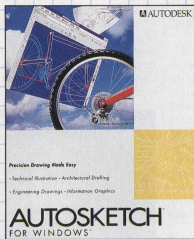


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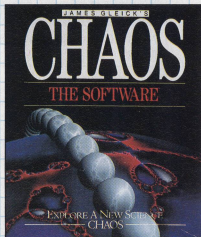
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*While you can buy better components individually, the AcerPAC is a great bundle*

a 2400 baud data modem/Group III fax board, telephone answering machine, internal CD-ROM drive, sound card and speakers and AM/FM tuner.

Many could cobble together a system with similar components for less than the AcerPAC's price, and even outstrip its performance. But what your put-together system would lack is the spatial design and cleverly integrated software that make this package so interesting.

The AcerPAC has sleek slimline case and good Super-VGA monitor, with ports for mouse, keyboard, parallel and serial, but then you find an AM/FM tuner aerial, a phone line-in and handset jack, and provision for a line-in to the sound card. The volume controls are positioned on the front panel alongside a MIC jack — no one wants to scabble round the rear of a PC for these.

The real smarts, though, lie in carefully designed software. Acer has its own Windows front-end (although you can switch to the Program Manager), providing access

to the different multimedia components. The fax system is a customised version of WinFax Lite, there's a record and playback answering machine, Works for Windows multimedia edition and Microsoft Bookshelf, and a Music Centre mimicking a stereo deck with AM/FM tuner, equaliser, balance, CD player and so on. Even the DOS Shell has been customised, and full manuals are provided online.

The software and hardware are beautifully integrated. Plug the phone and handset in (the internal microphone was disabled as part of Austel approval), or leave it 'hands free', select the answering machine and record a message up to 16 seconds. There is no limit on incoming messages, although 30 seconds is normal. A call arrives and is intercepted by your message. The AcerPAC identifies whether it's data or voice — if voice, your caller leaves their message, and if data the answering machine shuffles the call to WinFax Administrator which logs and stores the fax.

You can fax direct from your word processor, with WinFax support for headers and scheduled sends. Due to the SmartStart feature — which maintains your current software setup in RAM for instant recall on power on — your PC can 'wake up' to send or receive faxes or phone messages.

As well as playing audio CDs, you can do as I did and spend late nights listening to the cricket on the built-in radio while working. It's all possible. This box is the sum of its parts and not a collection of individual components.

There are some trade-offs. The slimline case makes for cramped quarters, with a crowded multisection board, only one free ISA slot, and no spare power connections or empty drive bays. With video becoming common, 486SX processors are increasingly inadequate. Acer has countered with its ChipUp technology. As it is, the AcerPAC has good memory, video and processor scores under PC Bench 7.01, and excels with its disk subsystem.

Experts would sniff with derision at the sound card's capabilities and the single speed drive. Opening the case is a nightmare and the documentation, though available online, is not much more elaborate than the sketchy printed manuals. In spite of these deficiencies, Acer has a winning formula. While rough around the edges, this machine's integrated design has the potential to run the multimedia-capable market off its feet.

quate home or small-office multimedia PC, this is not the market at which Apricot is aiming. The Xen-LS has been designed and constructed with a primacy of intent that differentiates it from almost all other PCs we've examined. The Xen-LS is the ultimate off-the-shelf Windows-based workgroup or network multimedia node.

In many ways, the Xen-LS reminds you of an Apple Mac, with security, networking, sound and drive controllers incorporated on the motherboard, and speakers and connectors placed sensibly as part of the case design.



*The Xen-LS II is an excellent multimedia network node*

The multimedia capabilities of this PC are practical, aimed at corporates rather than game players or creative types. The Professional Audio system uses the Yamaha Magic chip, which offers 12-bit analogue-digital conversion, at a sample rate of up to 44.1KHz. This makes it a reasonable compromise between tiny-sounding 8-bit add-in cards, and the full blow-away quality of 16-bit. Using an external stereo for output, you can pick the difference in quality, but it's not obvious. Using the internal speakers, the difference between 16 and 12-bit sound would be impossible to pick.

The Audio uses the Yamaha YMF262 FM synthesiser, and YM2635 multimedia controller. It has a five-channel mixer, with DAC, synthesiser, AT-style sound, CD-ROM and input-jack audio. There are two 3.5mm output jacks, a single stereo input jack, and a 15-pin MIDI connector conveniently located at the left hand side of the case. The system complies fully with MPC level 1, and Microsoft Windows standards, although it is not AdLib or SoundBlaster compatible. A front panel control provides easy access to speaker volume, power on, and the receiver for the infrared activated security system.

The internal speakers, situated at the extremities of the front casing, are not up to the quality of the LabTec speakers bundled by MediaVision or others, and their volume range was limited. They did not distort,

## AT A GLANCE

### AcerPAC 150+

<b>Distributor:</b>	Acer
<b>Telephone:</b>	(02) 418 8044
<b>Price:</b>	Around \$4500
<b>Specifications:</b>	486SX/25, 4M RAM/120M hard drive, fax modem, answering machine, SmartStart, 150K single session CD-ROM, integrated sound, Microsoft Bookshelf and Works, and sound control software.

## BENCHMARKS

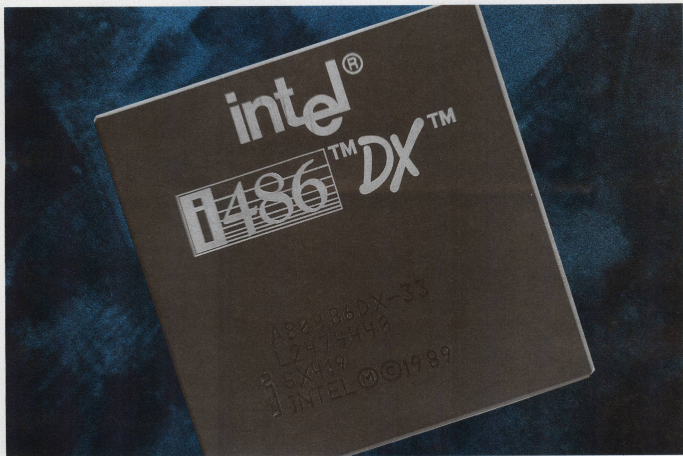
<b>Graphics WinMark</b>	3,053.204
<b>Disk WinMark</b>	22.957
<b>DOSMark</b>	29.31
<b>Processor</b>	6007.51
<b>Video</b>	3575.39
<b>Memory</b>	4275.84
<b>Disk</b>	39.96

## Apricot Xen-LS II

By Jeremy White

While the feature specifications for Apricot's Xen-LS II would make it an ade-

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# Apple plays to a multimedia future

BY DAN TEBBUTT

**T**here is nothing new about multimedia. It does not represent a watershed of the proportions of the personal computer or GUI. Multimedia is rather more characteristic of the impending convergence of disparate communications technologies that will increasingly dominate the computing and telecommunications industries, and enhance the way in which we transmit and receive information.

What has changed in recent times is the accessibility and ease of use associated with multimedia. Just as the PC revolution shifted computing power from centralised technophiles into the hands of the individual users, so multimedia will distribute the communications power of new information technology developments. It is in this area that Apple Computer has shown its durability, and the corporation's executives regard the Macintosh GUI and its consistent applications interface as their greatest strength.

While the Macintosh always handled sound better than PCs, the advent of QuickTime data compression architecture has staked a major claim for Apple in the multimedia realm. Essentially, QuickTime operates within the System 7 operating system to facilitate the use of high-resolution photography and full motion audio-video. QuickTime 1.5 is bundled with new Macs, and numerous standard applications have taken advantage of this facility. WordPerfect 2.1 and Microsoft Word 5.1 allow users to record voice annotations and incorporate pre-recorded or sampled sounds, even QuickTime movies. Such applications exemplify the 'SoHo market' for multimedia, as Mac users see simple but useful methods to enrich their communications.

Microsoft Word 5.0 for the Macintosh incor-

Apple Australia has recently targeted three fields where it sees its user-friendly multimedia technology as most viable. The example of estate agents retaining property portfolios in a multimedia database is attractive: clients could be shown prospective sites and make preliminary examinations of decor and structural layout without having to make frustrating trips to the usual array of sordid dives.

Multimedia simulations have also been touted for assistance in the legal process. "Visual aids, without prompting a witness, can legitimately assist their recall," commented high-profile Sydney lawyer, Chris Murphy, at the PC Show in Sydney earlier this year.

The third pitch of Apple's multimedia marketing is in visual presentations: while some technologically adept businesses use computerised slide preparation, and sometimes presentation, the spread of QuickTime will make it a reality that competent users can assemble audio-visual presentations.

Another area in which Apple should excel is the educational multimedia field. While some overseas universities have advanced computer education programmes, such as the Universidad de las Américas in Mexico (which provides several thousand Macintoshes for staff and students), computer aided-learning (CAL) and computer-aided research (CAR) remain relatively unimplemented tools in this country. A large market is poised to open up, with several Universities, most notably the University of Sydney, currently examining comprehensive CAL and CAR strategies.

The most attractive feature of CAL is that users can proceed at their own pace, repeating difficult steps, and catching up on missed work. CAL includes the potential to store electronically learning and teaching aids.

The Macintosh GUI is still its most laudable feature, streets ahead of the nearly ubiquitous Windows in the opinion of most commentators.

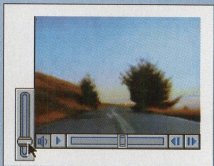
Present interest from a multimedia perspective has focussed on the new audio-visual-enhanced Centris 660AV and Quadra 840AV, which have stereo speakers fitted on special 14in Sony Trinitron colour monitors, and built-in CD-ROM drive (which many other mid-range Macs also incorporate).

The Centris is a 25MHz machine, the Quadra 40MHz, both based on the Motorola 68040 processor, supported by an AT&T digital signal processor (DSP), dedicated to specialised of voice, sound, video, and communications processing. While the market for such multimedia specialist machines may be limited, ironically because 'normal' Macs handle audio-visual so well, they will appeal to

users whose output quality is mission-critical. (For a full review of the AV series, see our First Looks on page 34.)

QuickTime appears to be a seminal development that will shape the multimedia operating environment. With its Windows release imminent, and no other 'enabling system software' positioned to set a counter-standard, QuickTime seems a sure bet. Performance-wise, it cannot be seriously faulted, within the limits of present common technology: sure, it has its pregnant pauses, but these are more due to the tardiness of CD-ROM. Given the amount of the data processed to output full-motion audio-visual, my experience on a Centris 650 with 8M of RAM and an LCIII with only 4M has not exposed any serious pitfalls.

Most popular applications have taken ad-



*QuickTime controls are standard across applications*



*The Apple Centris 660AV machine is dedicated to voice, sound, video and communications processing*

porates built-in sound handling and voice annotation capabilities, and a Movie Plug-in Module is distributed free to licensed users.

vantage of the integral way in which QuickTime operates under System 7. Some of these packages allow creation and editing of QuickTime movies from numerous sources (CDs, video-tape, pictures, drawing, sound, and laser-disks) in realtime. QuickTime Movies are controlled identically between applications, with buttons to control play/pause, review and cue. Slide controls allow rapid movement within a film and volume adjustment. Apple CD drivers also happily read audio-CDs, so with an application like Opcode's Audioshop you can play your favourite music in the background while working... anything that improves productivity, right?

Strategic partnerships are an industry rage of the moment, and Apple has been no straggler in this regard. It has launched a programme with Sony Australia to encourage greater development of the CD-ROM media. Slow demand and underdevelopment has held back the proliferation of CD-ROM, so obviously an attractive multimedia

*Continued on page 140*

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Continued from page 138

tool because of its digital data storage capacity. The "Professional Authoring Program" offers at reduced rates Sony's new CDW-900E CD recorder, using Macintosh Multimedia Formatter software, to Apple developers, consultants and major customers, in order to encourage CD-ROM expansion.

"We believe that the production of locally developed CD-ROM-based titles is absolutely critical to the development of multimedia in Australia," said Apple's Strong. "Its a fledgling industry which is well suited to the internationally acclaimed abilities of our Australian creative community. The Sony initiative is important because it significantly reduces the level of investment needed for local developers to start mastering their own CD titles."

A second impetus stems from the well-publicised Apple/Kodak partnership, which will assure the interaction of digitised photographic images and the QuickTime multimedia environment. The most marketable fruit of this alliance will be the Kodak PhotoCD, which will allow any

photographer to have their happy snaps developed in digitised form onto a compact disk, for about the cost of standard film development. Not only is the medium more durable than film or paper, it is far easier to catalogue photographs, and of course they can be readily incorporated into WP, DTP or multimedia presentations. A number of more sophisticated digital imaging tools for professionals will be released from this joint venture soon.

"It makes good business sense to work closely with Apple in developing this business because the Apple Macintosh platform is favoured by a large segment of our existing customers," said Dr Andy Sierakowski, general manager of Professional Imaging for Kodak.

While Apple has previously been left holding the Joker due to its high prices, the company's recent price slashing has put it onto a more than competitive footing in the cut-throat quality PC market. One can only hope that the subsequent reduced revenue will not unduly undermine the Corporations ability to produce ground breaking technological advances such as the original Mac, QuickTime and multimedia technology.

however, and are adequate for the Xen-LS's target applications. The bundled microphone is very Mac-like, with a shirt clip and sticky pad, and I was surprised by the quality of recording.

The CD-ROM controller, also integrated on the motherboard, is a Sony SLCD. The CD-ROM drive itself is located at the middle

of the case, and is tray rather than caddy loading. It's MPC level 1-compliant, with a transfer rate of 155K per second, but isn't multispin. Although updated drivers may provide multisection capability, this isn't something to rely on if you expect it as a requirement. Future models will correct this. A flip-down case protects the CD area. The half-height 5.25in CD-ROM bay is the only one available, so in this regard expansion is limited unless you're prepared to forgo CD.

The video adaptor is based on the Cirrus Logic chipset, with 1M of VRAM, and is capable of 1024 by 768 in 256 colours. Its performance, while adequate, didn't rate as highly as any other part of this PC. The DOS video harmonic was anywhere as low as a fifth that provided by comparable units based on VESA local bus and the 53 chipset, scoring just 2808.25, and the Windows Graphics WinMark was comparatively even worse, rating a fairly standard 2,041.122.

Despite the standard rate CD-ROM drive and moderate graphics performance, running Video for Windows clips was smooth, and there was no noticeable lag in redraw operations.

The monitor bundled, a Mitsubishi Diamond 14in is one of the best low-end SuperVGA monitors we've seen, with an OMO display (clean and bright — sorry). It's Trintor-based (there's also a 17in version) supporting VGA, EVGA and 1024 by 768 non-interlaced.

In other aspects though, this machine's performance was excellent. The review unit was a 33MHz 486, which makes its Processor harmonic of 9343.30 very good. Compare that to Osborne's nearly 11,000

with a 486DX2/66. The unit was well behind the Dell's DX2/66 mark of over 17,000, however. The Memory harmonic was relatively better still at 11,591.81.

Considering that there is no caching on the IDE drive controller used, the Disk harmonic of 36.46 for the 240M Maxtor drive was great, and boosted this machine to a DOSMark of 36.67, a mark nearly as high as the Osborne, and due to drive performance, better than the Dell, both of which were 486DX2/66 machines. As with the others, a caching drive controller would make a huge difference to these results. The Disk WinMark of 33.653 was better than both.

It is not the Apricot's multimedia capabilities — even the fact that the hardware is tightly integrated — that make this machine superb. The combination of commonsense multimedia with network and security features at reasonable prices set it apart.

The integrated Intel 82596 Ethernet controller provides local bus memory access, with adaptors for 10-BaseT, Thin and Thick Ethernet. Drivers are included not only for DOS and OS/2 NDIS, NetWare DOS ODI and server, and SCO Unix and FTP packet interface, but support is also included for remote booting with LAN Manager, IBM LAN Server, and NetWare 2.x and 3.x networks. A Token Ring adaptor is optional.

Although there are only three expansion slots, they are full length, and the fact that so many components are integrated on the motherboard means they are left free.

The review machine had LOC security enabled, a system combining hardware — an infrared keycard — and software — login IDs and drive encryption. Login details are kept in the CMOS, and the software component consists of Windows and DOS screensavers linked to the LOC IDs. You can invoke hardware security at any time using the keycard.

The Xen-LS II range is available in machines ranging from 486SX/25 to 486DX2/66, with drive capacity to 515M and up to 64M of RAM. The standard features include Professional Audio, the CD-ROM interface (the drive is optional), the local-bus Network controller, and LOC security system. Prices start from around \$3775 for a machine 486SX/25 machine with 4M RAM and 80M drive, and \$4128 for a 486SX/33 4/120. Our fully configured review machine came in at just over \$5000.

A Xen PC with Business Audio, rather than Professional Audio, and without CD-ROM or network controller is also available from around \$2996, as is a pizza-box-style 33MHz 486SLC-based network workstation, the Xen LS Pro from around \$3556. The LS Pro reminded us of a Mac LC, with its small footprint and high integration, except that it is a machine with far more ground than its Apple correlative. The only loss

## AT A GLANCE

## Apricot Xen-LS II

<b>Distributor:</b>	Apricot
<b>Telephone:</b>	(02) 888 9444
<b>Price:</b>	\$5140
<b>Specifications:</b>	486SX/33 with 4M of RAM and a 240M hard drive, Sony SLCD CD-ROM drive and integrated adaptor, Professional Audio, FM Mixing Desk, MIDI interface Microphone, Internal stereo speakers, three ISA expansion slots, local bus network controller, extended VGA graphics on motherboard 1024 by 768 by 256 colours, LOC Security System, 14in Mitsubishi Monitor, three years onsite parts and labour warranty

## BENCHMARKS

<b>Graphics WinMark</b>	2,041.122
<b>Disk WinMark</b>	33.653
<b>DOSMark</b>	36.67
<b>Processor harmonic</b>	9343.30
<b>Video harmonic</b>	2808.25
<b>Memory harmonic</b>	11591.81
<b>Disk harmonic</b>	36.46

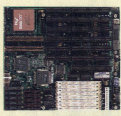


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  - Highly integrated LMC 82C418 Chipset
  - System speed selectable by software and hardware switch
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  - Supports 060328X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Two 16-bit and one 8-bit ISA expansion slots (synchronous)
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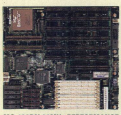
**MG-486DX2-66MHz PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	OVER 250
Landmark Ver 2.00 (Spectrum)	220.7
Power Master Ver 1.7 (MPPS)	27.1
Norton Utility Ver 6.01	130.8



## model MG-486DX-33MHz

- SPECIFICATIONS**
- INTEL 80486DX running at 33 MHz
  - Built in Math Co-processor
  - 8MB internal cache four way set associate write through cache
  - Highly integrated LMC 82C418 Chipset
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 060328X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Two 16-bit and one 8-bit ISA expansion slots (synchronous)
  - Two VESA Local Bus expansion slots
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
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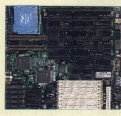
**MG-486DX-33MHz PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	150.7
Landmark Ver 2.00 (Spectrum)	110
Power Master Ver 1.7 (MPPS)	14.7
Norton Utility Ver 6.01	71.3



## model MG-486DX2-66MHz

- SPECIFICATIONS**
- INTEL 80486DX2-66 running at 66 MHz
  - Built in Math Co-processor
  - 8MB internal cache four way set associate write through cache
  - Highly integrated LMC 82C418 Chipset
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 060328X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Two 16-bit and one 8-bit ISA expansion slots (synchronous)
  - Two VESA Local Bus expansion slots
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



INTEL OVER DRIVE

**MG-486DX2-66MHz PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	OVER 260
Landmark Ver 2.00 (Spectrum)	225.7
Power Master Ver 1.7 (MPPS)	27.1
Norton Utility Ver 6.01	130.8



## model MG-486SX-33MHz

- SPECIFICATIONS**
- INTEL 80486SX running at 33 MHz
  - 8MB internal cache four way set associate write through cache
  - Highly integrated LMC 82C418 Chipset
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 060328X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Two 16-bit and one 8-bit ISA expansion slots (synchronous)
  - Two VESA Local Bus expansion slots
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



INTEL 486SX

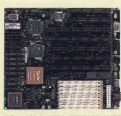
**MG-486SX-33MHz PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	130.2
Landmark Ver 2.00 (Spectrum)	110.3
Power Master Ver 1.7 (MPPS)	13.7
Norton Utility Ver 6.01	71.3



## model MG-486DLC-40MHz

- SPECIFICATIONS**
- CYRIX 68048LC-40 running at 40 MHz
  - Highly integrated LMC 82C418 Chipset
  - Supports Media 310 Floating Point Accelerator
  - Supports INTEL/AMC/Cyrix 80387 Math Co-processor
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 320X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Two 16-bit and two 8-bit ISA expansion slots (synchronous)
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



CYRIX 486DLC

**MG-486DLC-40MHz PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	105.3
Landmark Ver 2.00 (Spectrum)	129.9
Power Master Ver 1.7 (MPPS)	12.7
Norton Utility Ver 6.01	65.6



## MG PRODUCT LIST

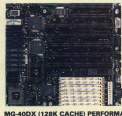
- MG-486DX2-66MHz (256K CACHE) VESA LOCAL BUS
- MG-486DX2-50MHz (256K CACHE) VESA LOCAL BUS
- MG-486DX-50MHz (256K CACHE) VESA LOCAL BUS
- MG-486DX-33MHz (256K CACHE) VESA LOCAL BUS
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- MG-386DX-40MHz (128K CACHE)
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## model MG-40DX(128K CACHE)

- SPECIFICATIONS**
- INTEL/AMC/CAT 80386SX-33MHz running at 33MHz
  - Highly integrated LMC 82C418 Chipset
  - Supports Media 310 Floating Point Accelerator
  - Supports INTEL/AMC/Cyrix 80387 Math Co-processor
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 320X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Five 16-bit and two 8-bit ISA expansion slots (synchronous)
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



AMD 386DX

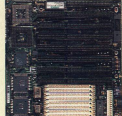
**MG-40DX (128K CACHE) PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	65.7
Landmark Ver 2.00 (Spectrum)	62.4
Power Master Ver 1.7 (MPPS)	6.1
Norton Utility Ver 6.01	43.2



## model MG-40DX (8K CACHE)

- SPECIFICATIONS**
- INTEL/AMC/CAT 80386SX-33MHz running at 33MHz
  - Highly integrated MDCC chipset
  - Built in 8 Kbit internal cache
  - Supports Media 310 Floating Point Accelerator
  - Supports INTEL/AMC/Cyrix 80387 Math Co-processor
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 32MB RAM
  - Supports 320X544R/1280X256GB secondary cache size
  - Supports Shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Five 16-bit and two 8-bit ISA expansion slots (synchronous)
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



AMD 386DX

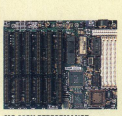
**MG-40DX (8K CACHE) PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	65.7
Landmark Ver 2.00 (Spectrum)	62.4
Power Master Ver 1.7 (MPPS)	6.1
Norton Utility Ver 6.01	43.2



## model MG-33SX

- SPECIFICATIONS**
- AMD 386SX-33 running at 33MHz
  - Highly integrated ACER single chip
  - System speed selectable by software and hardware switch
  - Flexible Memory size expandable from 1MB to 16MB RAM
  - Supports 80387SX Math Co-processor
  - Supports DRAM page mode access
  - Supports shadow RAM for System BIOS and Video BIOS
  - Legal AMI advanced BIOS with built-in setup
  - Six 16-bit ISA expansion slots (synchronous)
  - 3.3V rechargeable battery backup for CMOS memory and real time clock/calendar
  - 100% IBM PC AT compatible



AMD 386SX

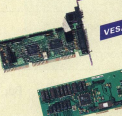
**MG-33SX PERFORMANCE**

SOFTWARE	TURBO MODE
Landmark Ver 1.14	42
Landmark Ver 2.00 (Spectrum)	39
Power Master Ver 1.7 (MPPS)	15.8
Norton Utility Ver 6.01	19



## model VESA LOCAL BUS VGA CARD

- SPECIFICATIONS**
- Cirrus Logic GD548 VGA Chip (VGA385)
  - Window accelerator (Hardware Cursor 32X32bit & 64x64bit and 800X) can speed up Window operation
  - Embedded graphics resistance mode providing 640x480, 800x600 and 1024X768 and 1280X1024 high Resolution in 16 and 256 simultaneously display colors
  - Support Maximum 792X Fast Rate (VESA Standard)
  - High Color graphics mode producing 640x480, 800x600 and 1024X768 resolution with 65,535 simultaneously display colors
  - High Color graphics mode producing 640x480 16.7M simultaneously display colors
  - 1MB on board expandable to 2MB
  - Drivers support extended graphics and test modes for most popular software



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with this unit is the lack of three ISA slots, but with all the componentry integrated on the motherboard, this is no loss at all.

Unfortunately, while there is basic audio control software, no multimedia titles are included. This is not a critical flaw considering the Xen-LS II's corporate target audience.

The off-the-shelf integration, and design premise of multimedia as a standard component of workgroup computing make Apricot an impressive option. A network multimedia node may be a very particular configuration, but it is well met by this machine.

## Dell Multimedia PC

By Jeremy White

Over the period of this review, Dell's status as an MPC changed from that of acceptable option to front runner, thanks to some serious price cuts and an increase in multimedia added value. If you ever needed proof that cut-price wars are waging in Australia, look through the ads run by Dell, Osborne and others over the last two months. The pressure is showing, and that's good news.

Dell takes a different approach to other

PC vendors in this feature, with multimedia provided as a \$700 option on top of the purchase of any Dell PC. That \$700 was acceptable value before the change, providing you with a standard MPC level 1-compliant Panasonic CD-ROM drive, and the SoundBlaster 16 audio card and speakers. Dell provided two PCs for review, to give us an idea of its range, and this was the kit that came factory-installed.

The same \$700 now gets you an XA-compliant Panasonic multispin, multisession, Kodak PhotoCD-compatible CD-ROM drive, the SoundBlaster 16 audio card and speakers, Microsoft Bookshelf, Microsoft Multimedia Works, and Microsoft Dinosaurs CDs. This is excellent value. Anyone buying a Dell would be mad not to include the Multimedia upgrade.

The multimedia componentry is pre-installed and configured, along with DOS 6.0 and Windows 3.1, with Dell's unlimited toll-free technical support and a one-year, next day, onsite warranty.

The SoundBlaster 16 occupies one slot in the slim-line case, and the CD-ROM the lower drive bay. The utility software for the SoundBlaster was preloaded.

The Dell 425s/L is a 486SX/25 with 4M RAM and a 120M hard drive, with VESA



*Recent price cutting and improved multimedia specs make Dell more attractive than ever*

local bus video and the Tseng S3 chipset-based graphics accelerator card. It comes with a 14in SuperVGA monitor, a single floppy (3.5in or 5.25in), a mouse, and one of the best keyboards on the market. The standalone price for the PC is \$2495, and \$3195 in a multimedia configuration, which is significantly better value.

The Dell 466/L is, in our opinion, the better buy for a multimedia machine. The base model costs \$3875 with 4M of RAM and

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## AT A GLANCE

**Dell 425s/L 4/120,  
Dell 466/L 4/120**

**Distributor:** Dell  
**Telephone:** 008 812 251  
**Price:** \$3195, \$4575  
**Specifications:** 14in SuperVGA Monitor; S3 chip-set Tseng Labs VESA local bus video accelerator; CPU upgradable to Pentium; Panasonic XA-compatible multi-spin, multisession CD-ROM drive; SoundBlaster 16 card  
**Software:** DOS 6.0, Windows 3.1  
**CD-ROMs:** Microsoft Bookshelf; Microsoft Multimedia Works; Microsoft Dinosaurs

## BENCHMARKS

<b>Graphics WinMark</b>	20,093,201
<b>Disk WinMark</b>	26,145
<b>DOSMark</b>	28.72
<b>Processor harmonic</b>	17,546.96
<b>Video harmonic</b>	7023.97
<b>Memory harmonic</b>	10,009.15
<b>Disk harmonic</b>	22.33

a 120M drive. As with the 425s/L, you get local bus video and the Tseng graphics accelerator, a SuperVGA monitor and a slimline case. The review unit also had Dell's dual 3.5in/5.25in floppy drive. With the multimedia option, the cost is \$4575.

Apart from the low drive capacity and performance, this is good value for a machine that is nearly a multimedia powerhouse. For serious work, we'd add at least another 4M of RAM (\$250), and go for the 320M hard drive (\$1000). As it was, the drive performance inhibited this machine on our benchmarks. The comparatively mediocre DOSMark of 28.72 can be directly attributed to the low Disk harmonic score of 22.33. The Disk WinMark was also a lacklustre 26,145.

Compare this to the Windows graphics performance, with a Graphics WinMark of 20,093,201. The combination of local bus video and the Tseng accelerator really flew! The raw processor performance was also excellent, with a harmonic of 17,546.96, one of the highest we've seen. Memory and video harmonics were also both high at 10,009.15 and 7023.97 respectively.

For running CD-ROM titles, the impact of the slower hard drive performance was negligible on this system. As CD titles only install a minimum amount locally, the 120M drive space did not prove a restriction. The exact opposite would apply should you wish to use this machine for authoring, however, as video is heavily reliant on drive space and speed.

The graphics performance shone running Microsoft Dinosaurs, particularly the short video documentaries the package includes.

There is a subjective appeal in a well made PC, such as those from NEC, Compaq, AST or Dell. Dell and Osborne are the combatants in this round though, and, whereas a month earlier the value marker was clearly falling to Osborne, there is now very little in it. Amongst the DX2/66 machines, Dell offers superior 16-bit sound and CD titles for around \$500 extra, but the Osborne is a better general-purpose PC — thanks to its faster 240M hard drive. Our recommendations of double-speed CD-ROMs and 16-bit sound should tip the favour to Dell, but gut says buyer inclinations won't be so clean-cut.

**Media Pro Chassis  
MPC-9000 [CP1]****By David Lin**

There is enormous potential in the MPC-9000. It feels a bit rough round the edges, but the basics are there. Multimedia is arguably about the biggest, the best, and the fastest, and this machine has ample processing power to not only play but author multimedia.



*The Media Pro is rough around the edges, but has potential*

VESA local bus is quickly becoming a popular way for manufacturers to boost performance. Overloading the processor with local bus devices will have a negative impact on performance, though, and software drivers need to be customised to take advantage of componentry, which is where the story of the MPC-9000 takes a good turn and a not so good turn.

The multimedia PC is overwhelmingly Windows-centric. If you intend to run the best all-round multimedia, with exceptions, then you are running Windows. To get the best from Windows the whole system needs to be properly configured. Elite Industries has had the foresight to provide a Cirrus Logic-based VLB graphics ac-

celerator, but hasn't provided the correct video driver, making performance tests under Windows misleading.

We looked at the MPC-9000 with the standard Microsoft-supplied VGA driver with the Cirrus Logic card and then placed a Diamond Viper VLB card using the reputedly fastest accelerator available today and loaded the Viper drivers. The difference in performance was tangible. Why tie a boat anchor to a racehorse and expect it to clock well? Stock VGA sixteen colours also do not compare to full 24-bit colour.

On the other hand, the other VLB slot was occupied by the best performer of the entire system — the caching drive controller. A cool 4M of onboard RAM cuts disk access to only a dream. Ahh, that more systems could be enabled this way! The difference lay in Elite supplying the driver software and documentation for the card.

After a foray into video editing, dragging loads of streamed digital video on another machine to and from disk, the controller was appreciated. Combined with local bus access, the 'real' performance savings must be 50 per cent or more. This controller was very good, benchmarking at 87.89.

The built-in speakers eliminate the ad hoc impression you commonly get with any 'upgrade', including unsightly cables and fiddling for free IRQs and memory addresses — the pains that go with turning a machine into something for which it wasn't intended. We found the soundcard adequate for playback, but it is neither 16-bit nor SoundBlaster Pro compatible.

The Xebec hard disk was a mystery. Hard disks are notoriously one of those components that live and die on recommendation. I had never heard of Xebec before, but it performed without so much as a whimper.

The bundled software titles should be improved. Reference works like Software Toolworks' Multimedia Encyclopedia pale against Encarta or The Animals!. Given the

## AT A GLANCE

**Media-Pro Chassis  
MPC-9000**

**Distributor:** Elite Industries  
**Telephone:** (02) 898 0222  
**Price:** \$4990 (tested configuration)

## BENCHMARKS

<b>DOSMark(tm)</b>	48.58
<b>Processor Harmonic</b>	9060.87
<b>Video Harmonic</b>	7511.79
<b>Memory Harmonic</b>	5048.44
<b>Disk Harmonic</b>	87.89

choice, buy the MPC-9000 sans software and choose your own.

Elite has cut corners for this price-point. Definates on the wish list, apart from supplying video drivers, include a reasonable user manual, spare expansion slots, a better software bundle, RAM, RAM and more RAM, and 16-bit sound card with SoundBlaster Pro compatibility. Still, for the price, this system has the processing power and hard disk muscle to take you into the multimedia experience and back — but be prepared for some bumps on the trip.

## Compro Eclipse Voyager Multimedia PC

By Ben Gerholt

Compro's Voyager MPC is a great mid-level machine with an even more attractive price tag. The 486 DX2/50 VESA local bus machine comes with Compro's SUPRA multimedia upgrade kit. This kit, also available separately, comprises Panasonic CR62 double-velocity drive (300K per second), SUPRA 16-bit 44.1kHz stereo sound card, speakers and seven CD-ROM titles.

The hardware handled our PC Labs



The Compro offers great value for money despite its flaws

benchmark tests very well. The processor harmonic of 12570.02 was excellent — it was helped by 256K of write-back cache, and the Graphics WinMark was 7.685 megapixels per second thanks to the 2M CIRRUS Logic VESA local bus VGA card. This is a good Windows machine. The disk harmonic of 35.5 K per second is respectable as although the machine has a Promise 32-bit I/O controller there is no caching.

The machine came with the Compro kit installed. Both the dual-speed Panasonic CD-ROM and Supra 16 soundcard perform well but the output from the screenbeat shielded speakers is average. Software in the pack include some good audio utilities to use with the card, some good general CD-ROMS, and authoring software which can be used

to create your own multimedia applications.

The system comes with 4M of RAM and a 240M hard disk. To increase performance, more RAM, preferably 8M or higher, would be a good idea, and more disk space is advised. Nearly a third of the disk is full of multimedia application and configuration files on arrival, so if you intend to do serious audio, video, or authoring, or even if you use a large number of applications, disk space may become scarce quickly.

There are, however, some disappointing characteristics of this MPC. The AOC 14in non-interlaced VGA monitor is not that good, with an often indistinct or washed out display, and picture edges out of square with the casing. While not uncommon in budget monitors this is nevertheless annoying.

The box itself is in a mini-tower configuration, with a full-width front panel door on the case covering floppy drives, switches, and CD-ROM. I personally found constantly opening and closing this door irritating, and tended to leave it open. The position of the

CD-ROM is also a problem. The drive has a internal tray loading mechanism, and when loading CDs the caddy is fully ejected. Unfortunately the open/close button for the caddy is located just under the disk entrance on the right-hand face of the machine, which is also the side on which the front panel door is hinged. As the CD-ROM was located at the bottom of the case, it was difficult to get a hand under to select the close button, which over few days became increasingly frustrating. This is a simple and easily corrected design flaw.

The story inside the case is much better. The layout is uncluttered and even with the soundcard/SCSI controller installed there are three expansion slots left unused.

Before choosing this unit you have to ask yourself a simple question: do you live with the configuration as is or add more and increase the price? My recommendation would be to live with the faults, they aren't overwhelming — just part of the trade-off for the great price of \$4490.

The Compro Eclipse DX2-50 MPC is distributed by KCM Direct, a direct-sell company operating out of Melbourne. This is the company's top-of-the-line, off-the-shelf MPC solution. In summary, it performs very well and is ideally suited to authoring or serious exploration, and at this price, is a machine worth serious consideration. KCM Direct also has a Neostar 486SX33 Multimedia machine with an 8-bit sound card and single-velocity CD-ROM drive from \$2590.

## NEC PowerMate 466i MPC with CD Gallery

By Ben Gerholt

For this feature NEC provided a PowerMate 466i (486DX2/66) with a 17in MultiSync monitor and top-of-the-line CD-ROM package, CD Gallery.

The CD Gallery upgrade kit retails for \$2137, which, while not cheap, comes complete with NEC's MultiSpin 74 CD-ROM



A beautiful system, the NEC is breathtakingly expensive full configured

### AT A GLANCE

#### Compro 486DX2/50 with internal CD & soundcard

**Distributor:** KCM Direct  
**Telephone:** (03) 429 2733  
**Price:** \$4490  
**Specifications:** Compro 486DX2/50 Mini Tower, VESA local bus motherboard, inc. ZIF socket upgradeable to P5, Intel DX2/50 MHz Overdrive CPU installed, 4M RAM, 256K write-back cache, 2M CIRRUS LOGIC VESA local bus VGA card, 16.7 million colours, Promise 32-bit I/O & HD controller, AOC non-interlaced 14in monitor, 250M hard disk, 13ms access, 1.44M & 1.2M floppies, Honeywell 101 keyboard, MS mouse, ScreenBeat speakers, Panasonic CR62 double velocity CD-ROM drive (300 K/second), SUPRA 16 sound card

Compton's MultiMedia Encyclopedia — Windows Edition, Authorware, STAR for Windows, Macromedia Action for Windows, Microsoft Bookshelf OR Microsoft Works, XF5700 Mantis Experimental Fighter from MicroProse, The Seventh Guest, Media Clips 2

#### CD-ROMs

### BENCHMARKS

Graphics WinMark	7,684,778.5
Disk WinMark	39438.5
DOSMark	34.9
Processor Harmonic	12570.02
Video Harmonic	6976.2
Memory Harmonic	5275.39
Disk Harmonic	35.48



## AT A GLANCE

**NEC PowerMate 466i  
(486DX2/66)**

**Distributor:** NEC  
**Telephone:** (02) 930 2000  
**Price:** As tested: Powermate 466i, 17in Multisync, CD-Gallery, \$10,196; Or: PowerMate 466i with 14in monitor & CD-Gallery, \$8150; PowerMate 466i, 14in monitor alone, \$6012

**Specifications:** 1M Video RAM, 340M drive, 3.5in floppy, 16M RAM, NEC MultiSync 5F6e 17in monitor, NEC Multisync External CD-ROM, NEC Multimedia Audio Card, pair of Labtec Stereo CD Speakers, Labtec Stereo computer headphones, Audio combination cable. The connector for the External CD-ROM included cables joystick, MIDI system and external audio source.

**CD-ROMs:** Where in the World is Carmen Sandiego — Deluxe Edition, Guinness Disc of Records, Great Wonders of the World, Sherlock Holmes, Consulting Detective, The New Groliers Multimedia Encyclopedia, Mavis Beacon Teaches Typing.

## BENCHMARKS

<b>Graphics WinMark</b>	7038129
<b>Disk WinMark</b>	51315
<b>DOSMark</b>	39.67
<b>Processor Harmonic</b>	11349.93
<b>Video Harmonic</b>	12539.62
<b>Memory Harmonic</b>	9331
<b>Disk Harmonic</b>	39.1

drive, NEC Multimedia Plus Audio Board, a set of Labtec shielded speakers and headphones, and six general category CD-ROM titles. For full details refer to NEC's CD Gallery upgrade kit review on page 145.

The chunky CDR-74 external drive is dual speed or Multisync, and supports the new extended architecture (XA) format that allows both audio and data to be transferred enabling video tracks with sound to be played smoothly. The drive also supports Kodak's PhotoCD. Perhaps the only disappointment I had with the drive was the use of a removable disk caddy rather than a tray loading mechanism, which, of course, makes no difference to the performance of the drive.

The CD-ROM hooks directly into the NEC Plus Audio Boards external SCSI port. The audio board itself works well, supporting both SoundBlaster and Adlib and providing 16-bit stereo sound. The Labtec speakers are a specifically shielded design to avoid interfering with the monitor but, while good for mini-speakers, don't really provide great audio.

NEC's PowerMates are solid, well designed computers that perform very well. The tested machine, a 486DX2/66, came with 16M of RAM that certainly improved overall performance of the box. The machine's DOSMark on benchmark tests however, was dramatically reduced when software caching was removed. This was the single factor for a reduction from 65.2 to 39.67 in the DOSMark. 2M of software caching increased the disk harmonic for the 340M drive from 39.1 to 105.2 K per second, an indication of how effective software caching is on units that don't use a caching drive controller. Lightning-fast video performance was a key feature of this MPC configuration. At 12,539 thousand operations per second and a Graphics Winmark of seven million megapixels per second, the Tseng ET4000 chipset with 1M of video RAM clearly performed well, although nowhere nearly highly as the VESA-based units.

The combination of accelerator with the magnificent 17in MultiSync monitor was a joy. Running Kodak's PhotoCD Sampler for Windows (not included in the CD Gallery pack) in 24-bit mode did not even slightly faze the machine. You can manipulate these images onscreen without the slightest delay.

During use, the 340M hard drive performed well. For testing we recorded a two minute CD track to an 11M .wav file, without problem, and were able to play it back with no noticeable loss of quality, even while launching and using other Windows applications. I enjoyed using this machine during our test period. It is clearly ideal for authoring multimedia work and is certainly perfect to explore the use of the new PhotoCD technology. With this in mind it would not only be a great Multimedia machine but a perfect DTP workstation, especially for the production of heavily photo-journalistic publications.

The price tag of \$10,196 for this setup is somewhat heart stopping, but if you're prepared to sacrifice the 17in MultiSync for the 14in monitor standard with the PowerMate 466i the price drops to a (slightly) more respectable \$8150. Reducing processor specifications, and dropping the amount of RAM brings it back within the realms of its competitors, both for price and performance. Even so, this is still not a low price for this market sector and potential purchasers should carefully examine their own needs and other less costly options before going with this quality NEC machine.

**Osborne****By Jeremy White**

If you're looking for a PC with some guts for a good price, and want to try out basic

multimedia at the same time, Osborne's bundles are hard to bypass. Our comparison of features, specifications and price left us highly impressed, despite some reservations about the multimedia side of the range. These machines aren't for the multimedia professional, but for an interested end-user, they're superb value.

Osborne's approach breaks a few of our own rules for multimedia PCs. The company uses the 8-bit Creative Technology SoundBlaster 2.0, which occupies two slots, one for the CD-ROM controller, and another for the soundcard, although the CD-ROM drive is a Panasonic double-



*With 8-bit sound it doesn't quite meet our ideal specs, but for a general purpose multimedia PC you couldn't do better*

speed 300K per second unit. The bundled speakers are prone to distortion, even at lower volume levels.

Unlike most of the other multimedia bundles we considered, the Osborne was skint when it came to bundled multimedia titles — no Microsoft Bookshelf (although this can be purchased as an option) or Groliers, no Grandma and Me or Carmen Sandiego, and no Seventh Guest or Battle Chess.

What these bundles lack in multimedia panache, however, they make up for in terms of PC value.

There are two bundle deals in the Osborne multimedia range. The one we evaluated retailed for \$3995. For this price, you get a 486DX2/66 CPU with a slimline case, 4M of RAM, a 240M hard drive, a 1.44M 3.5in floppy, a 101 Honeywell keyboard, one parallel and two serial ports, a Microsoft Mouse and mousepad. You also get a 14in rebadged Phillips SuperVGA monitor, which is excellent, VESA local bus video, with an accelerator based on the S3 chipset, the SoundBlaster 8-bit soundcard and CD-ROM drive, DOS 6.0, Windows 3.1, Lotus AmiPro 3.0 and a multimedia edition of Lotus 1-2-3.

This is excellent value for money, especially considering that Osborne offers five years onsite service and support, and was



## AT A GLANCE

## Osborne 486DX2/66

## Multimedia PC

**Distributor:** Osborne  
**Telephone:** (02) 955 1544  
**Price:** \$3995  
**Bundle includes:** 8-bit SoundBlaster sound card, SoundBlaster speakers, Panasonic CD-ROM, Lotus 1-2-3 Multimedia edition and AmiPro 3.0, Osborne online reference manuals and front-end software.

**Specifications:** Slim-line case, 4M RAM, 240M drive, 14in SuperVGA, Diamond S3 graphics accelerator, VESA local bus, MS mouse, DOS 6.0, Windows 3.1, 3.5in floppy drive

## BENCHMARKS

Graphics WinMark	16,555.597
Disk WinMark	31,087
DOSMark	37.67
Processor Harmonic	10,830.03
Video Harmonic	6877.04
Memory Harmonic	8952.78
Disk Harmonic	37.08

one of the best-rated PC companies in our 1993 Service and Reliability Survey.

The slimline case is cleverly designed, packing an apparently roomy box with four drive bays — two by two at the front middle-right of the case — three of which are occupied by the hard drive, floppy drive and CD-ROM. The unit is ISA-based, and carries three slots at the back left, and then two more running off the back-pane of the bus alternate to those on the left. That's four drive bays and five slots in a slimline case!


The VESA graphics subsystem performed outstandingly, registering 16.5 megapixels per second for PC Labs Graphics WinMark in 800 by 600 by 256-colour mode. The drive also performed well for a non-caching IDE controller, with a Disk harmonic of 37.08. A VESA-based caching controller, one of Osborne's options, would make this unit fly, although you would also need to add Osborne's \$200 256K write-through processor cache to avoid deterioration of the Processor harmonic score of 10,830. When you first open the Osborne packaging, you notice there are no manuals or disks for DOS or Windows. Osborne includes a CD-ROM with online references, tutorials, and all required software installation disks and drivers. The only time you'll need paper-based reference material is if you can't get the PC working: and with Osborne's service structure and five-year warranty, if this is the case you'll be calling tech support anyway.

The 'Osborne Front End' runs over Windows, and, like Apple's Easy Access software, provides large, easy-to-navigate icons for reference and training materials, and to access the pre-installed software, including AmiPro and 1-2-3.

The package also had a good local feel to it. Starting Windows on most of the other PCs we evaluated, you'd be greeted with an Amie Schwarzeneger 'hasta la vista' or other Americanism. The Osborne fires up with a very local sounding 'welcome to your Osborne computer'.

The other Osborne multimedia bundle

is also worth consideration for an off-the-shelf complete computing solution. This unit is a 486SX/33-based machine selling for \$3595. This doesn't sound that good a buy compared to the DX2/66 until you consider that the price includes an inkjet printer and a 15in SuperVGA monitor. Apart from a 170M drive, the bundles are otherwise identical.

The most interesting aspect of these Osborne bundles is that they treat PC sound and CD-ROM access as standard items for a Windows PC. They're an excellent example of multimedia moving mainstream. 

...machines, our results and reader feedback continue to suggest that DOS 6.0 DoubleSpace is causing significant problems on a wide variety of DOS machines.

— InfoWorld  
May 10, 1993

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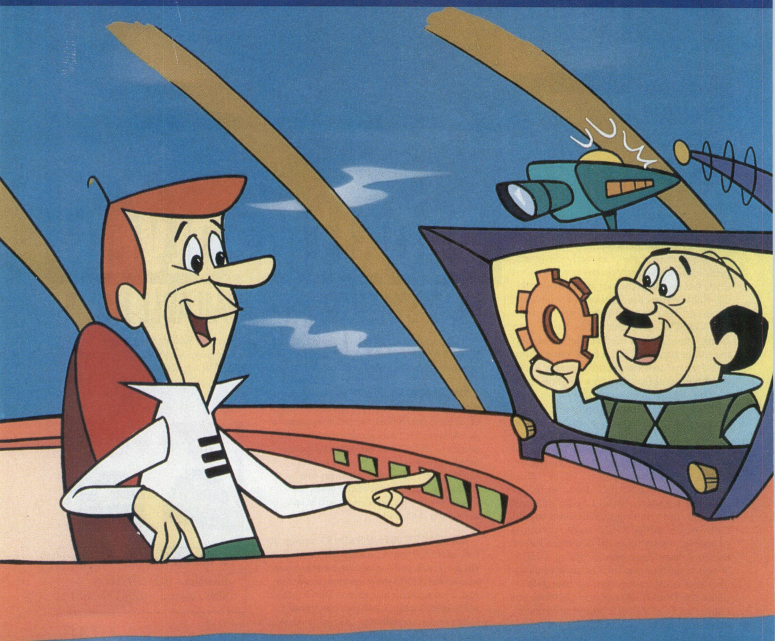
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FEATURES VIDEO

# Video cono

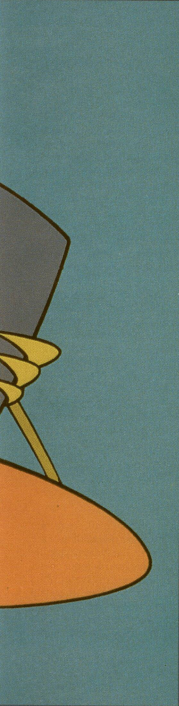


Original illustration produced by Hanna-Barbera on general public's perception of video computing.



# Users the desktop

*The integration of full-motion video on desktop computers has begun. Out of the box, your system will soon allow you to have live videoconferences, attach a video clips to your data files, and view video files from your desk. Leading the way are Apple with its new AV Macintosh series and Silicon Graphics with its Indy workstation.*



O nce only a fantasy of world's fairs and Jetsons cartoons, video communication is finally arriving as a serious business tool. But instead of being packaged in a standalone, phone-like device, it is riding into the workplace on the back of personal computers. The integration of video into PCs offers much more than the ability to see the person on the other end of the line: content-rich video will enable new kinds of collaborative work.

US-based companies are leading the way. New products from Apple and Silicon Graphics exemplify the trend to support motion video in desktop systems. Just as computer makers earlier added colour, bitmapped graphics, and audio to PCs, now they are building in video. The Silicon Graphics Indy and two new Apple Macs – the Centris 660AV and the Quadra 840AV (see reviews in First Looks, this issue) – include hardware for input and output of analogue video, video digitisation, digital signal processing for image manipulation and compression, and software support for handling video data. The Indy even includes a tiny video camera as standard equipment.

Such capabilities have been available from third-party vendors such as SuperMac, RasterOps, and Creative Labs at considerable cost to purchase, install, and integrate. Apple's QuickTime and Microsoft's Video for Windows added system-level software support for handling synchronised digital-video data, but hardware was still extra. Now, with starting prices as low as \$5195 for the Centris 660AV and \$9990 for the Indy workstation, you can buy a system ready to handle video right out of the box. In effect, video has become nearly free, and the implications for computer users are enormous.

BY ANDY REINHARDT



"People are going to be really surprised at how powerful [video] is," says multimedia analyst Denise Caruso, editor of the Digital Media newsletter in San Francisco. When video becomes standard, programmers will write software that takes advantage of it and users will treat it like just another data type, such as text, graphics, or audio.

This will open up new, more effective channels of communication among individuals and workgroups. Presentation packages, word processors, databases, and even spreadsheets will support video clips and annotations. Email packages will add support for video attachments to messages. Multimedia titles will become richer, more dynamic, and more widely distributed.

Perhaps the most significant potential lies with desktop videoconferencing. You can, in effect, turn your PC into a video-phone by sending pictures captured with your computer's camera in real-time across high-speed telephone lines or over a LAN. Or you could employ a store-and-forward architecture, sending those pictures to a central repository for delivery at a later time.

Sarah Dickinson, an analyst at US-based Personal Technology Research, has been monitoring the migration of videoconferencing technology from large room-size systems to the desktop. "When you put this technology on the motherboard," Dickinson says, "it changes everything."

Both real-time videoconferencing and store-and-forward video mail present technical, cultural, and economic hurdles. Each puts stress on the existing communications infrastructure and forces the user to work in new ways. And as with any emerging technology, the cost of successfully applying video throughout the enterprise is high.

## New media

Built-in video capabilities will be harnessed in a number of ways. Foremost among them is delivery of prepared content in either analogue or digital form. Thus, the new Apple and SGI systems can accept analogue video signals (NTCS or PAL) directly from cable, a VCR, or a laser video disk and display the picture in a window. This means that you could watch CNN while you work on a spreadsheet, or view a training videotape for a new software package while using the program in a separate window.

Likewise, digital video, delivered on a CD-ROM or across a network, can be displayed onscreen or merged with other video sources and graphics. A company with networked, video-equipped computers can use this infrastructure to deliver informational or motivational videos. For example, Sun Microsystems sent its employees a digital-video holiday greeting from chairman and CEO Scott McNeely last December, and SGI

REAL TIME VS STORE-AND-FORWARD	
Real-time video conferencing	Store-and-forward video mail
Live, interactive collaboration	Non-interactive
Parties must be present to use	Send and receive on your own schedule
Needs few system resources, since video is passed through	Needs more system resources, i.e. CPU, bus bandwidth, disk space
Needs expensive real-time compression technology	Video compression can be done off-line or in software
Supports real-time document conferencing as well	Not meant for real-time document conferencing
Hard for people who speak different languages	Can view video and respond at your own pace
Conveys innuendo and non-verbal information	Not much better than voice mail
Requires special LANs, i.e. synchronous, ATM	Operates over conventional LAN
Needs fast, expensive telecom services for WAN links	Operates over analogue phones

distributed to its staff a digital video of the visit earlier this year by President Bill Clinton and Vice President Al Gore.

Computer-based training is the most promising short-term application for desktop video, especially if the materials are interactive and customisable by the user — that is, if they take advantage of the computer rather than working in the linear fashion of videotape. For example, hypertext links can allow you to go through a lesson in the order and at the pace that suit you. "Every company is looking at how to train its people faster and faster," says Marika Ruumet, network manager for HP-TV, Hewlett-Packard's programming network for business partners.

In addition to playing prerecorded content, you can also capture still frames and video clips with the Indy and Mac AV systems. You just plug a camcorder into the video port; the hardware to digitise and compress video is built in. Once the video is digitised, you can attach it to a mail message and send it to a colleague. Or you can use an editing package such as Adobe Premiere 3.0 to alter images, rearrange frames and sequences, and add titles, music, and voice-overs. While this process will not produce professional-quality video, the resulting presentation can be output to analogue video — using a so-called print-to-tape capability — for playback on any VCR.

## Video mail

Once you've got digital video inside your system, you gain the ability to send it to somebody else, assuming that you're on a LAN or connected to the phone system. Both real-time and store-and-forward video messaging will get a big boost from systems like the Mac AVs and the Indy.

The advantage of video mail, says Ann Earon, head of US specialist firm Telemanagement Resources International, is that it lets you send and receive whenever you're ready. This is especially important when dealing in foreign languages. Earon notes that Asian users haven't widely embraced real-time videoconferencing, not only because live sessions with other countries involve inconvenient hours, but also because of cultural reasons. "They'd rather receive a video transmission, discuss it, and then respond," she says. For international communications, Earon asserts, store-and-forward video is "very suitable."

Store-and-forward messaging is much easier to accommodate in networks than is real-time communications, because packets can be deferred for later delivery. Unlike videoconferencing, video mail doesn't require vast amounts of synchronous bandwidth. Videoconferencing can demand anywhere from 14.4Kbps for low-quality analogue transmissions to at least 128Kbps for full-screen digital transmission. Traditional room-size systems use 384Kbps or more.

However, because video is such a dense data type, mailing and storing it require large amounts of processing power and hard drive space on both ends of the communication link. Caruso dismisses store-and-forward video mail as "bull"; she doubts that users really want or need to send and receive video clips of "talking heads," which often convey little more than a voice-mail message. "I don't see the point of all that overhead for the problem you're trying to solve," Caruso says. Video files could also spell problems for networks: frequent video-mail file transfers could clog LANs.

## Conferencing

By contrast with video mail, real-time videoconferencing is less demanding of the host system, because the video typically passes through the machine without chewing up CPU resources or system-bus bandwidth. Because it's live, the data neither comes from nor is saved to a hard drive; users who want to preserve video conferences for posterity usually output them to a VCR.

But the acceptance of traditional videoconferencing has been slow, so many industry observers are sceptical about its potential on the desktop. They argue that

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# Document conferencing keeps your data close-by

One of the main advantages of a desktop system is that the video communications occurs on the same machine where you keep your electronic documents. "You're closer to your data," says Chris Herot, director of advanced technology for Lotus Development in the US. "You don't have to bring it with you down the hall." Compression Labs' Cameo, PictureTel's Live PCS 100, and other desktop systems thus typically offer the ability to send — and in most cases to work collaboratively on — documents. Because document conferencing can be done over conventional phone lines without expensive hardware add-ins, it's likely to become prevalent far sooner than desktop video. Consequently, many desktop video conferencing systems give equal weight to document conferencing.

Document conferencing is typically designed much like a two-way version of remote-control software packages, such as pcAnywhere or Timbuktu. The 'master' user owns the document and runs the application that created it, while one or more 'slave' users see a bitmapped image of the document that they can mark up and annotate in real-time. Document images can be saved at all locations, but the original is usually modified only if the master gives keyboard or mouse control to remote users. Files can also be sent among users, often in the background.

Many of these packages also support whiteboarding, or the ability to draw or type on a blank white window, usually in 'ink' colour-coded by the user. The more sophisticated products also permit multiple simultaneous masters and slaves; that is, I share my Excel spreadsheet with you while you share your Ami Pro report with me. Some offer better performance by trapping GDI (Graphical Device Interface) calls and keyboard/mouse inputs instead of transmitting compressed bitmaps. But at this point, none of the packages permit actual application sharing, where the same document is loaded up on both sides and collaboratively modified, although several vendors say that they are working towards this capability.

Visit, from Northern Telecom in the US, was an early entrant in the desktop market. The product has the distinction of being the only system that now runs on both the Mac and Windows and can interoperate between them. Its video, however, is limited to grey scale. Visit requires digital or leased lines but uses only one 64Kbps ISDN channel or 56Kbps switched line (Switched-56) to deliver 10 to 15 frames per second (fps) of video. Northern Telecom plans to enhance the system this year with support for colour, H.261 compression, and multipoint bridges, says Jeff Berman, manager of market development for the company.

NCR's TeleMedia Connection is a similar system, but it supports 15fps quarter-screen colour video over dual ISDN channels — ie, 128Kbps. NCR sells the product primarily as a document-sharing system for Windows, with H.261 videoconferencing as a bonus. TeleMedia Connection sells for between \$US5000 and \$US7000, depending on whether the user already has an AT&T 8510 ISDN phone (to which is run an interface cable) or needs to add an ISDN card to the PC. Neil Whittington, assistant vice president of NCR's workstation products division, multimedia business unit, says support for Switched-56 and analogue lines (for document sharing only, not video) will be added later.

Another Windows video/document conferencing system is DVTS from GTE. It offers H.261 compression, frame rates of from 7.5 to 30fps, and a whiteboard feature. It supports ISDN and Switched-56, or you can use it over a high-speed modem.

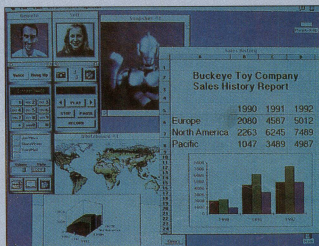
Creative Technologies, the parent company of Creative Labs (best known for the SoundBlaster and VideoBlaster), has recently acquired the Mac-based ShareView and ShareView Plus products that set new standards in this category because they were designed to run over analogue lines. ShareView, which sells for \$US1195 and is being distributed by NetComm in Sydney on (02) 888 5533 (local prices were not available as we went to press), includes a NuBus board, a 14.4Kbps modem, a handset, and software that permits audio communications,

whiteboarding, and collaborative document sharing. The \$US4499 Plus version of the product adds a video camera and a second NuBus card that uses a proprietary compression scheme capable of sending images ranging from 80 by 96 pixels up to 160 by 190 pixels at rates of 5 to 12fps. Creative's plans for the product include expanding to Windows, and supporting digital telephony and standards-based codecs.

Nuts Technologies, a California-based start-up, has announced but not yet shipped a product called Hello 918 that reportedly supports analogue and ISDN with video rates of 5 to 30fps. Eye-Tel Communications in North Vancouver, Canada, recently acquired a company called TelAmerica Video Conferencing, and sells a line of products called Tel-Eye-Vision that range from low-cost graphics file transfer and document-sharing tools to a \$US10,000 conferencing system based on H.261 and digital lines.

For OS/2, IBM (tel: 13 2426) sells Person-to-Person/2, a whiteboarding and document-sharing package that also supports live videoconferencing via IBM's ActionMedia II card. Versions of the software for Windows and AIX are planned for later this year, with Mac support in 1994. The \$US280 package (\$US1875 for a 10-user licence) lets up to five users at a time share a common chalkboard or mark up documents. The package runs now over Token Ring and Ethernet LANs using NetBIOS, with native IPX support slated soon, and requires ISDN for WAN (wide area network) connections.

In what may augur a future trend, Peregrine Software in California has developed a software-only networked videoconferencing product that runs on off-the-shelf video hardware. Instead of being sold as a turn-key or integrated solution, Peregrine's as-yet unnamed package will run on any PC that is equipped with a video camera and a capture card supported by Microsoft Video for Windows. Features include shared documents and real-time video over NetWare or NetBIOS LANs (and over WAN links faster than 128Kbps), and network software that manages the video streaming and frame rate.



**Creative Technologies' ShareView Plus is now available only for the Mac but is slated for other platforms. This groundbreaking package offers document sharing and videoconferencing over a standard analogue phone line, using proprietary compression. The video rate can be as low as 5fps, so Creative plans to add support for digital telephony and standard codecs**



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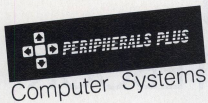
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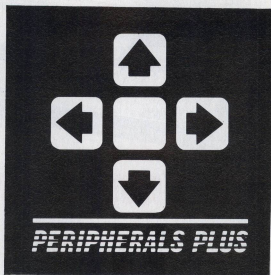
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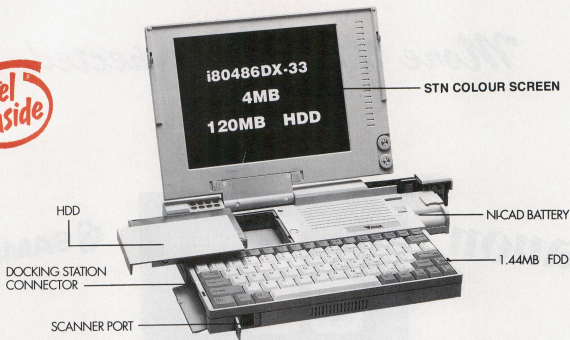
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line, often referred to as POTS (for 'plain old telephone system'). Even digital ISDN doesn't come close to offering that much bandwidth.

One answer is to simply increase the bandwidth of the pipeline by replacing copper wire with fibre-optic cable. However, that calls for an enormous investment in infrastructure.

## Compression critical

Compression is the obvious solution, but even the best of today's compression schemes aren't up to the challenge. To squeeze a TV-quality video signal through a 64Kbps ISDN channel, you'd have to invent a codec algorithm that discards more than 99 per cent of the data without seriously degrading the image.

As a result, desktop videoconferencing systems typically compromise by offering smaller windows (as tiny as 80 by 96 pixels), grainier colour (8 bits per pixel instead of 24 bits), and lower frame rates (5fps or less under certain conditions). These trade-offs reduce the bit stream to manageable levels.

Many codecs can achieve these levels of compression, but some require more time to compress than they do to decompress. MPEG, a standard fostered by the Moving Pictures Experts Group in the US, and

Cinepak, a proprietary but widely licensed codec from SuperMac technology, are examples of so-called asymmetrical codecs. They are better suited for store-and-forward applications or prerecorded video on CD-ROMs than for real-time videoconferencing. If an asymmetrical codec is implemented in high-speed silicon, however, it can effectively become symmetrical by supporting real-time conversion at both ends.

Even when a codec works in real-time, the data pathway adds a certain amount of time lag. If the pathway is a LAN, the delay might be dependent on the size of the network and the volume of traffic. On a long-distance phone line, delays are inevitable as the signal is beamed from ground stations to satellites. The goal is to keep the total overhead below 250 milliseconds or so; otherwise, it interferes with spontaneous conversation. Overseas telephone calls usually limit the delay to 200ms.

After solving all these problems, you're still got to make sure everyone is using the same compression and transmission standard. Otherwise, there's no guarantee you can make a connection with a person across the street, much less on another continent.

In late 1990, the CCITT adopted a worldwide specification for video compression called H.261 (see sidebar 'Video compression standard vie for acceptance' on page 156) that made it possible for dif-

ferent systems to interoperate. Suppliers like CLI and PictureTel have added support for H.261, typically in the form of an upgrade option, but most suppliers argue that the specification suffers by comparison with their own proprietary algorithms.

## Networked video

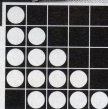
Networking with video raises problems that go beyond mere bandwidth. Today's office LANs usually use shared media and are non-real-time. Because video requires predictable delivery, sending it over all but the most lightly loaded LANs can be disastrous. Solutions such as switched Ethernet and FDDI (Fibre Distributed Data Interface) help provide more bandwidth, but they're still not deterministic. The ultimate solution has to be isochronous Ethernet or an entirely new protocol such as ATM (Asynchronous Transfer Mode).

A few companies are now addressing this problem in novel ways. For instance, Fluent in the US sells an NLM (NetWare loadable module) that adds synchronisation of video data to a conventional NetWare LAN. A combination of server and client-based software modules dynamically tunes the video frame rate to accommodate the available network bandwidth. Starlight Networks, in Mountain View, California, has taken the different approach of developing a new media-transport

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# Video compression standards vie for acceptance

BY TOM R HALFHILL

Imagine if you couldn't send a fax outside your company because the recipient's fax machine recognised a different transmission standard than yours. Or suppose the public telephone system lacked sufficient bandwidth to handle a fax transmission at all. Welcome to videoconferencing, 1993.

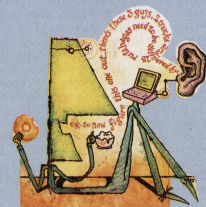
But there is hope. The CCITT, which established the Group 3 standard that lets fax machines communicate worldwide, is trying to bring the same order to videoconferencing. It is promoting a specification known as H.261 (pronounced 'H-dot261') or Px64 ('P times 64').

H.261 defines a scheme for sending video at speeds from 64Kbps to 2Mbps. At the low end of the spectrum, H.261 fits into an ISDN channel; at the high end, it needs wider-bandwidth dedicated lines, such as T1. The standard defines a video window of 352 by 288 pixels, known as CIF (Common Intermediate Format). It also supports QCIF (Quarter CIF), a smaller window of 176 by 144 pixels. Related specifications cover still-frame graphics, call-setup protocols, and other issues.

Large conference-room video systems, such as those from PictureTel and Compression Labs, traditionally rely on their own proprietary codecs, although they offer H.261 as an option. In the desktop market, not everyone seems to be greeting H.261 with open arms.

"The problem with H.261 is that it lends itself to very, very expensive hardware," says Paul Nahi, a product director at Media Vision in California. "Videoconferencing will become popular when, and only when, you can set up a node for under \$US200. That's \$US200 for the plug-in board, the software, and the camera."

Media Vision is pushing its own proprietary



codecs known as MotiVE (Motion Video Engine) and Captain Crunch. MotiVE is a codec that's licensed to Microsoft for use with Video for Windows. Captain Crunch is a newer codec that will be available on a pair of chips for under \$US40 by the end of the year. Media Vision intends to sell the chip set to other vendors and use it in a line of desktop video products.

Weitek is developing a new family of chips that will improve playback in Video for Windows and eventually support the most popular codecs, including Captain Crunch, Cinepak, MPEG, and Intel's Indeo. Intel and Microsoft are backing Indeo for desktop video, although Microsoft has also licensed Cinepak for use with Video for Windows. Intel's Smart Video Recorder, an ISA board for PCs, uses the Intel 750 video processor and Indeo to

capture and record live video onto a hard disk in real-time.

Although Intel has alliances with Bell Atlantic and Ameritech and is known to be working on desktop videoconferencing products, it's not clear if it will implement Indeo, H.261, or some other codec. "Our policy is to follow existing standards when they make sense, and to introduce new standards if they don't already exist or [existing ones] don't offer a good solution," says Scott Darling, marketing director of Intel's business communications division.

AT&T Microelectronics' AVP-1000 chip set supports H.261/Px64 and MPEG for full-motion video, plus JPEG for still-image compression. Motorola and BT (in London) are also developing a chip set that supports H.261, MPEG, and JPEG. Those chips will appear on PC expansion boards from BT next year.

Nearly everyone is focusing on ISDN or LANs as the minimum requirement for acceptable video quality. But California start-up company Knex says it will soon introduce the Holy Grail of video codecs: a radical new compression scheme that can send 320 by 240-pixel colour images at 15 frames per second over POTS (plain old television system) with a transmission delay of under 200 milliseconds. "Our goal is to make it possible for any two people on the face of the earth to communicate with each other visually over ordinary phone lines," says Steve Johnson, Knex's chief operating officer.

That goal has eluded everyone since the first prototype videophones drew curious crowds at the 1964 World's Fair in New York. But until the codec chaos is resolved, videoconferencing will be more local than global.

## CODECS FOR DESKTOP VIDEOCONFERENCING

CODEC	SOURCE	APPLICATIONS	ADOPTERS
Captain Crunch	Media Vision	Video playback, videoconferencing, CD-ROM	Cirrus Logic, Weitek
Cinepak	SuperMac Technology	Video playback, videoconferencing, CD-ROM	Apple, Atari, Cirrus Logic, Creative Labs, Microsoft, Sega, 3DO
H.261/Px64	CCITT	Universal videoconferencing over digital phone lines and LANs	AT&T, British Telecom, CLI, Motorola, NEC, Picture-Tel, Video Telecom
Indeo	Intel	Video playback, CD-ROM	Apple, Microsoft
JPEG	Joint Photographic Experts Group	Still image compression and transmission	Widespread
MotiVE	Media Vision	Video playback, videoconferencing, CD-ROM	Microsoft
MPEG	Moving Pictures Experts Group	Video playback, videoconferencing, CD-ROM	Philips, many others



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# Pandora and the active office

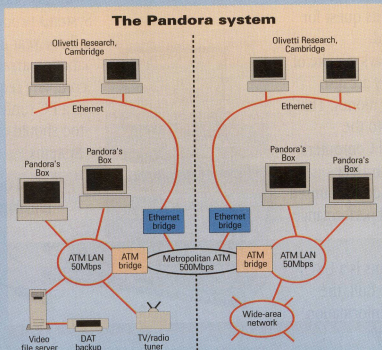
BY DICK POUNTAIN

Europe's largest PC manufacturer, Olivetti, sees its future products converging into a system it calls the Active Office. With the Active Office, digital video and audio services will be able to follow individuals around from room to room via the active badges they wear. Not only will your videophone calls get routed to the workstation you're nearest to, but your whole desktop might follow, too, so that you're not forced to wrestle with Fred's purple-on-green windows and Albanian keyboard layout.

The components of this Active Office are being developed at Olivetti Research in a joint venture between Olivetti and DEC that's sited in Cambridge in the UK. The key enabling technologies are high-speed ATM (Asynchronous Transfer Mode) networks, a distributed multimedia system called Pandora and its successor Medusa, and the active badges themselves. ORL presently runs a network of more than 40 Pandora workstations — spread over four separate sites about a kilometre apart in central Cambridge — that provides videophone, video-mail, and conferencing services.

## The Pandora system

Pandora is an all-digital multimedia systems that



*Pandora handles video via a subsystem approach, with separate frame stores for the workstation's screen display and for incoming video streams.*

*Pandora's Box acts as a pixel switch that merges video into the workstation's display, a design that yields high performance but makes it difficult for workstation software to access video data. In contrast, Medusa, the successor to Pandora, places raw video data directly onto the workstation bus, where it can be manipulated by software*

transports multiple streams of 'medium quality' video and audio to each workstation in a network. Every Pandora user gets a high-resolution Unix workstation connected to a video camera, telephone, microphone, and loudspeaker via a unit

called Pandora's Box, which combines the functions of network interface, stream manager and video mixer.

Each Pandora's Box contains no less than six Innos T45 transputers acting as embedded controllers: one to sample the video camera; one to manage an analogue video mixer and combine incoming video with the workstation's X-Window System display; one to handle audio, sampled at 8KHz; one to switch data streams, say, to and from the compression and expansion hardware; and two to act as ATM network I/O processors.

Apart from the total bandwidth of the ATM network, there's no hard limit on the number of video streams or screen windows that a Pandora system can handle. For example, a four-party video-conference might use 28 simultaneous streams — 12 video and 12 audio for two-way connection of all pairs of participants, plus four extra video streams to show participants their own local image.

Pandora is designed to approach overload. Audio always takes priority, and video packets will be discarded first if the system

*Continued on page 162*

network protocol that is optimised for video. And Fore Systems in Pittsburgh in the US sells an ATM-based network switch that the company says is designed for multimedia. Olivetti is also developing Pandora, an ATM-based distributed multimedia system with videoconferencing capability (see sidebar 'Pandora and the active office' on page 160).

Given the high cost of installing video conferencing on every desktop, the following model may turn out to be a common architecture: PCs will run software compression such as Intel's Indeo to shrink video data sent over the LAN, and then a specialised video gateway server will cross-translate that video into H.261 or another communication-

oriented protocol for transmission over WANs (wide area networks). A model such as this distributes the cost of hardware compression over more users, and it also eliminates the need to bring ISDN-class telephony to every desktop.

## What's wrong

In the end, user needs and corporate culture will dictate how video technology is used. Mark Lowenstein, an analyst with the Yankee Group in Boston, cites four issues: cost, quality, connectivity and applications. Systems like CLI's Cameo and Northern Telecom's Visit are too pricey for PC

owners, he says. A Yankee Group study found that 50 per cent of respondents would consider buying desktop videoconferencing if it cost \$US1000 or less, but none of them would pay more than \$US5000.

Clearly, integrating video I/O on the desktop, as the AV Macs and the Indy do, greatly reduces its cost. But since the price of H.261-level compression will likely stay high, either new compression schemes will have to emerge or desktop systems will have to share compression services on a LAN through a video server.

Quality levels will also have to rise if desktop video is to prove useful. William Cogshall, head of New Media Research in



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Continued from page 160

can't cope, because users will tolerate degraded picture quality better than fuzzy sound. One of the audio transporter's duties is to apply echo and feedback cancellation, which ORL has found to be crucial to Pandora's acceptability in real office environments.

### ATM networking

ORL is a strong champion of ATM as the most suitable form of network for real-time multimedia systems. ATM is a variant of packet switching in which short, fixed-length data packets called cells are transmitted via 'end-to-end' virtual circuits, rather than by destination or route addressing. Unlike many packet schemes, ATM always preserves the time ordering of its packets. ORL originally implemented 32-byte cells but has now moved to 48-byte cells (with 5-byte headers) for greater ease of interworking with broadband ISDN.

ATM has several advantages for multimedia applications, of which the most important is predictability. Popular networks like Ethernet have sufficient capacity to carry small amounts of video (for example, for video mail), but they impose unpredictably long transmission delays that greatly complicate the design of real-time multimedia systems; for example, data might have to be time-stamped to allow resynchronisation on arrival. ATM's short cell size and virtual circuits guarantee a low upper bound on transmission delays, measurable in microseconds. Pandora can work without explicit synchronisation between streams and needs to employ time stamping only when

video-recording to a server's hard disk. Other advantages of ATM include scalability right up to global area networks using the same data format, and dynamic bandwidth sharing, which permits graceful degradation and efficient load balancing.

ORL's current ATM networks use a 500Mbps fibre-optic backbone between remote sites, with 50Mbps coaxial LANs connecting local workstations. A range of ATM switches and an ARM-based (Advanced RISC Machine) ATM protocol engine called ATMos have emerged from the Pandora project, along with bridges to Ethernet and WANs.

### Medusa and active badge

ORL is now working on Medusa, the successor to Pandora. Medusa will support eight or 16 cameras per workstation, making possible applications like non-deskbound videophones or broadcasting lectures and meetings with viewer-selectable camera angles. It extends Pandora's use of time stamps to support more stream types, like infrared or sonar-depth information devices and very slow streams such as those produced by active badges sending location information.

Medusa separates devices into two classes: those that attach to a workstation cluster and those that attach directly to the ATM network. The former work with raw video data that can be manipulated by graphics software on the workstation, while the latter use JPEG compressed data to reduce data volumes.

Active badges are small clip-on devices that employ infra-red signalling to send the wearer's location to a network of sensors once every 15 seconds. The badges are based on a commonly

available 5-bit encoder chip designed for remote controllers and have a one-year battery life. They are never turned off, but they have a light sensor that switches them to a low-power state when they're put in a dark drawer or pocket.

The current ORL implementation only allows a workstation user to locate and page any other badge wearers within the four sites spanned by the network, and to check their nearest phone extension and current status. (For example, "in a meeting", or "do not disturb") by using commands like FIND, WITH, LOOK and NOTIFY. ORL has also created tiny active tags called PiCOs (Portable Interactive Computing Objects) that you can attach to equipment like printers, workstations, and phones to integrate these resources into the location map. In future, badge location will be used to route video mail and much more.

Despite initial misgivings about their Orwellian privacy implications, ORL people have taken to the badges well. During a year's non-compulsory trial, no one has stopped wearing the badge; the reduction in disruptive phone calls and fruitless trips to find colleagues seem to be adequate reward.

ORL's Pandora network has generated other useful data on the user acceptability of multimedia systems. Off-line video mail has proved far the most popular facility, followed by two-way live video-phone. Videoconferencing is less popular, and least popular of all is the mixed text-and-video document. ORL's users seem to prefer to treat text and video mail as alternatives, with different applicability. Many people also like to use the videophone to greet colleagues by waving or nodding with the sound turned off.

California, argues that what a user sees onscreen has to be 'actionable'; that is, the quality has to be high enough that "you can tell whether their smiles are sincere."

Otherwise, videoconferencing isn't an acceptable substitute for face-to-face meetings. To achieve this quality level, the frame rate has to be at least 10fps, preferably 15fps, and the window size needs to be a quarter of the screen or larger.

The problem with connectivity is simply that analogue lines can't support effective videoconferencing given today's compression algorithms and modems. Barring breakthroughs in compression, the only solution is digital telephony services, but more than any other factor, this could be an impediment to acceptance. ISDN and Switched-56 are more expensive than analogue and still not available in many places. Worse, the phone

companies themselves still seem ambivalent about their commitment to ISDN. Says Lowenstein, "Connectivity is simply not there."

### THE VIDEO COMPUTER

- Fast 32-bit processor
- Video input (NTSC/PAL to VGA or other display)
- Video output (VGA or other to NTSC/PAL)
- Video camera, analogue or digital
- DSP or specialty chips for processing digital video
- Compression/decompression in silicon
- Fast path to memory and hard disk
- Access to digital communications (ISDN, Switched-56, LAN)

The last factor, applications, will be solved by a combination of developer and user ingenuity. Microsoft, for instance, is moving to provide APIs and back-end service interfaces that will let programmers write video-enabled applications without worrying about the underlying transport mechanisms. Capabilities like OLE 2.0 already permit video objects to be linked into compliant Windows ap-

plications.

For now, the question remains whether or not people really want their desktop systems to become videophones. Kenneth Bosomworth, president of International Resource Development in the US, cites studies that suggest people fundamentally

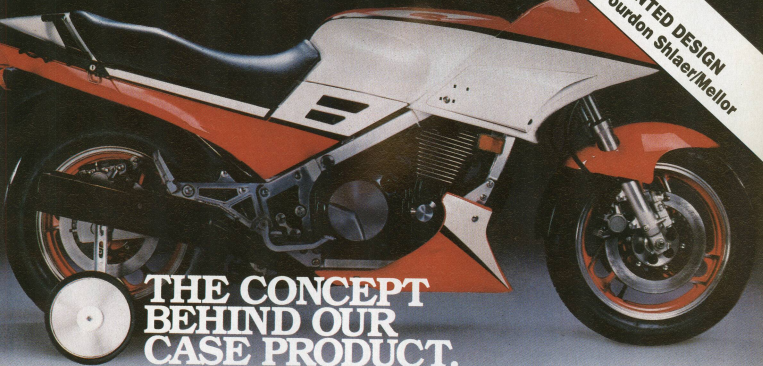
don't enjoy videoconferencing — or at least the room-type systems available up to now. Desktop conferencing could be a different story because it is more intimate.

Observers conclude that in the short term, document sharing may be the most easily applied and widely used component of desktop video communication. Talking heads' video windows are a snazzy, if underpowered, option that will gain in usefulness as the information infrastructure develops. If real-time conferencing is only one of the video-related activities that people harness on their systems, users will eventually get used to it, in the same way that they acclimatised to telephones and voice mail.

Video computing is the next major step in the evolution of the personal computer. As more media types are integrated into systems, the lines that have separated phones, PCs, TVs and other consumer electronics will blur.

For more information on the Silicon Graphics Indy workstation, contact Martin Fogarty at SGI Graphics in (02) 879 9500. For details on Apple systems, contact Apple Australia or your local authorised reseller. ☎

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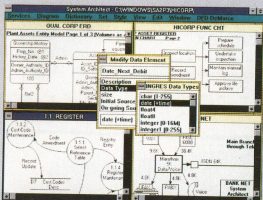
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# FASTMODEMS

BY JEREMY TORR

**T**here is one thing modems today are definitely good at: moving the goalposts. Just when you thought it was safe to invest in a V.32 9600bps unit with all the attractions of fast transfer speed, error correction and a fairly stable standard on most BBSs and dial-up services, along comes V.32bis, with 14,400bps, error correction and compression at not much more than the cost of a 9600 box.

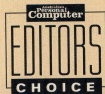
With the V.Fast standard also looming on the horizon, the chances are the cost of fast data modems will drop even further as protocols and standards become more established and markets widen. The cost differential between V.32 and V.32bis modems is now down to \$100 or so. So for a slightly bigger initial investment, you can potentially double data transmission rates and correspondingly halve phone bills. But as with any new technology, informed choice is essential.

Given you are looking for a fast modem, which factors should you be looking at when choosing? There are several criteria, any of which may be more important for your particular use.

*Talk to any business person, or people who use bulletin boards or data exchange systems, and they will quickly tell you what gives them grief. Phone bills. If you use a phone line, whether for voice or data transmission, you need to know you are getting the best value possible out of the service. We test a handful of data modems that can help keep the costs down.*

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## ■ Dataplex DPX 596

## ■ Interlink Fastbit Ibis

The accolade of best of the bunch is always a hard one to pin on. This is more so with products like data modems, which need to work in such a variety of conditions that like-with-like comparison is very difficult to achieve. In picking the favourite, we looked at performance; that included data speed exchange, link establishment time, Hayes compatibility out of the box, and suitability to remote software operation.

We also looked at value for money, ease of use, information provision both in terms of manuals and status indicators on the modems themselves, phone support and completeness of presentation. But despite these all-encompassing criteria, it was still sufficiently difficult to choose that we felt bound to opt for two modems, one for dedicated business use, the other for home or non-dedicated use.

Although the Dataplex DPX 596 is the most expensive, its broad range of connection options, good readout, manual configuration buttons and reliable performance must put it at the top of the list for business use.

On the home front the choice has to go with the Interlink Fastbit Ibis. It is fastest, cheapest, has reasonable connection options and a passable status display. Although it only has MNP4, not V.42 error correction, it seemed to handle 14,400 bps fine. It also comes with software which, even if it doesn't thrill you, will get you up and running, plus installation and operating system hints which many of the more expensive models leave out.

When it comes down to it, the choice must be yours. Or should you simply leave the choice open and buy a V.Fast modem when they start to arrive later this year? Nobody said modems were easy.

## Making the choice

Obviously, raw throughput speed is important. This is what will help you pay for the unit in the long term. Just as important is the protocol set it supports; unless it is mainstream with CCITT (V.21 through to V.42) standards or MNP-based operating standards, you could be in trouble if you want to talk to a wide range of other operators.

Software compatibility is also very important. While we look at several data modems in this review that come bundled with their own software, remember you are likely to be exchanging data with a broad range of other packages, and could also start to use another package at some time in the future. So locking yourself into one proprietary system is definitely a bad policy.

Another largely overlooked factor which becomes more important the faster (and therefore more complex) modems become is the status display. A few lights are fine for 2400bps, but when a line keeps dropping out at 14,400, you need as much information as possible to tell you why things are not happening as they should. Generally speaking, the larger the number of lights or status indicators the better. Lights that change colour, blink or otherwise have multiple signals can confuse the issue; on or off is the best.

Having said that, the best indicator of what is going on is the LCD alphanumeric display. Of our test suite only the Datalink 14.4 had this, and it was a noticeable improvement over the other offerings. A good

display will be of immeasurable help when troubleshooting or setting up a communications link. Other basic, yet important, aspects when choosing a data modem are the size and shape of the case, the number and type of phone and comms sockets on the back, and the length of the supplied leads. All these are important in making your final choice.

Likewise, the amount of added value you get can tip the balance in favour of a particular model. Good bundled software, long-term backup and warranty, good local representation and competent support all make a slightly less powerful modem look better than a faster but less well-equipped unit.

Your use of the modem is also a major factor. If you are linking two business sites together, the ability to use a leased line connection or a combination of public and leased line services is obviously important. Line checking facilities are also useful, as is the option to perform remote diagnostics. These extras are not usually found on cheaper modems but can be a real time and money saver in business applications. Similarly, connection time may not seem to be a big deal, but if your modem dials quickly but takes half a minute to finish handshaking and establish a fast link, you are still piling up the costs on that long-distance call.

## Old problems, new solutions

The move towards error control and data compression has forced manufacturers into

a new area of technology which requires new standards. As such there are no real solutions, with MNP, CCITT and Hayes all putting up standards. Consequently, there is both a variation in performance, and also less reliability and predictability than with say, 2400bps modems.

When 9600bps modems first started to appear, such speed was only possible through the use of error control protocols, the first of which was MNP4, developed by Microcom. This is a proprietary standard which is still in common use — in fact, V.42 uses it as a fallback mode to CCITT standards. But MNP has been largely replaced by V.42, and similarly Microcom's MNP5 has given way to the V.42bis data compression protocol as the general standard. So, although the normal operations of any modem will not be affected, the need for choosing the right protocols becomes much more important.

If all the makers can agree, V.Fast should replace all the existing high-speed protocols, but there is scope for a lack of take-up here as the next phase of communications, ISDN (Integrated Services Digital Network), should be a viable alternative to modulated data transmission within a few years.

Consequently, the establishment of one standard protocol has been difficult if not impossible. Especially as the only cross-platform standard (Hayes) is not really a standard, but a set of proprietary commands. Therefore, unless you are buying modems in pairs for communicating exclusively with each other, the higher the level of interoperability the better.

When checking specifications and looking for potential savings, don't allow yourself (or the salesperson) to get carried away with direct comparisons of speed and savings. V.32bis is capable of a maximum of 14,400bps, certainly, but it won't always have your phone bill in comparison to a 9600bps modem. V.32bis can, after checking the line quality, fall back as low as 4800bps.

Equally, it can go back up again, but generally speaking, this seldom happens on the public network.

Another often overlooked issue when choosing is modem backward compatibility. Having the fastest, latest model can be a disadvantage if it cannot talk to older, slower modems. Using V.42 error control you can connect to modems using V.22, V.22bis, V.32 as well as V.32bis. But you won't be able to use V.42 with V.21 or V.23. Likewise, using V.42 means you can take advantage of an older MNP protocol modem as long as it has MNP4. Because V.42 uses MNP4 as its fallback mode, the two will be able to work on the same error control protocol. But MNP5 and V.42bis compression standards do not have the same relation-



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## How we tested

To make sure we were being fair to the modems during testing, we set up a dumb terminal in Melbourne using the tried and tested US Robotics Fax Modem running at 14,400bps, and remotely accessed the unit using pcAnywhere and the shareware old faithful, Telix. Both software and hardware have been around long enough on BBSs and dial-up services in the US to establish themselves as solid and relatively bug free.

Telix was used to check simple file throughput speed, and pcAnywhere was used to see how the units fared during two-way communication sessions. We sent a 256K Ami Pro file containing both text and graphics across the link, and played a standard macro using pcAnywhere. To ensure

Product name	
SUITABILITY TO TASK	
Business use	<b>POOR</b>
Home use	<b>FAIR</b>
Data	<b>GOOD</b>
Remote applications	<b>EXCELLENT</b>

call routing was not the cause of large discrepancies in the results, we made four calls at intervals throughout the day and averaged out the results in each case. (In fact, the differences were very slight; Telecom must have a reasonably efficient routing system in Melbourne).

Likewise, we made calls to a BBS in the US, to check the units' stability on lines with delay and possible high noise levels. Actually, the results were not vastly different from the local calls, which points to increasing maturity and stability in most of the products.

Lastly, we made a couple of personal calls, both to the sales department and the technical labs of each supplier, to give us some idea of the levels of support. The response we got was noted and added to the list of pros and cons.

ship; that is why most fast modems have MNP5 as well as V.42bis to allow them to talk to other MNP-based systems.

## Compatibility

Once you have narrowed down the field by checking out which protocols and performance criteria you are looking for, you should make sure the modem you are looking at is right for the software you intend using. Although most software will work with most modems, to get the most out of any package there has to be a high degree of compatibility. If you take any modem and type AT commands directly into the software, chances are it will work fine. But if you are looking for real-world functionality, you will obviously want to automate most tasks such as dialling, logging on and possibly running complex scripts.

If you already have several special scripts and procedures set up in your current communications operation, finding it doesn't work on your new fast modem can be a real nuisance. In this case, going for a modem which adheres as closely as possible to the Hayes standard is the safest bet. Just make sure it is compatible with the Hayes command set you are already using, either Smartmodem 300/1200, Smartmodem 2400, or Smartmodem V/Optima. Most manufacturers will give you details of the command set they use.

Alternatively, make sure both modem and software vendors are likely to give support when using the others' product. Finding out neither vendor is interested in helping after you have invested the cash is of little consolation. This applies especially where you are working over a leased line using specialist software to perform a specific task.

## And the rest

Presentation and packaging, information, backup and accessories are also important when making the choice. Look for phone cables — preferably piggy-back types. Ideally, a serial cable should be included too (NetComm manages to include one, so why don't the others?). Robust packaging in case you need to send the unit back for service is also a plus, as is a quick reference card for both software and hardware, and a good warranty. All the models we look at give 12 months, with NetComm giving two years.

## Scitex Datalink 14.4

The Scitex Datalink 14.4 is definitely one of the heavyweights in this group of modems. Although as fast and sporting even more features than most, it seems a bit lumpy in



The Scitex Datalink 14.4, though the bulkiest unit we looked at, features an impressive LCD display and front panel control

## AT A GLANCE

### Scitex Datalink 14.4

**Distributor:** Scitex  
**Telephone:** (02) 428 9555  
**Price:** \$1709  
**In short:** A solid reliable workhorse for those prepared to invest some time in setting up and installing suitable software.

appearance and presentation when compared to the others in this review. It is also pricey at \$1709. Although the US-sourced product, built by Penril, has an external power supply, it still has the biggest case of all the units. The other feature that sets it apart is the LCD display unit, which is obviously designed for those who want to know exactly what is happening to their communications session.

The front panel also has a set of six push-button switches that give access to a range of dedicated features and controls. The back panel has the usual power-in and RS-232 25-pin sockets, plus a special RJ45 diagnostic line socket and a separate RJ11 leased line socket, in addition to the usual line-out (this also uses an RJ45 so don't lose the original cable). Two data cables are supplied, one for a dedicated line, and one with an extra Telecom output for shared lines. Neither is very long, but the power lead has more length than most. One curious factor is the REN (ring equivalence number) which is a fairly big 3.0 — the Banksia, in comparison, is only 0.4. This makes a dedicated line almost obligatory as more phone devices on the same line would soon become too much for the phone company to handle.

Plugging in and setting up is fairly straightforward, but the manual could do with some jazzing up — it reads like a rather dull thesis. Operation is easy enough once we discovered the preset Quick Setups, which could be dialled in by using the front panel buttons. These allow

### Scitex Datalink 14.4

SUITABILITY TO TASK	
Business use	<b>EXCELLENT</b>
Home use	<b>POOR</b>
Data	<b>GOOD</b>
Remote applications	<b>FAIR</b>

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The DE-650 is a credit card size Ethernet adapter that plugs into the PCMCIA slot, now a standard feature of many notebooks. Switchless and automatic configuration makes this a hassle-free installation. Two media couplers are available, BNC and UTP which may be interchanged with the same base unit. The unit supports all major networking software including IBM PC LAN v1.31, OS/2 LAN Server v2.0, Novell NetWare v3.x, Lite, LAN Manager v2.1, DEC PathWorks v4.0, SCO Unix/Xenix, FTP TCP/IP, NetBIOS, D-Link's LANsmart and TCP/IP.

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a very broad range of options, including leased line, 2-wire and 4-wire, plus a whole stack of speed settings, all at the push of a button. The LCD display tells you which mode is being used, and when we selected Hayes it logged onto pcAnywhere with no complaints.

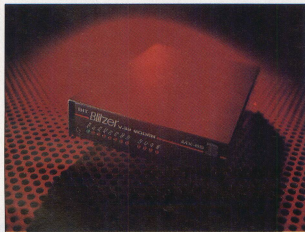
The Datalink is the fastest of the group when it came to establishing a connection. From opening the line to a ready screen took only eight seconds; if you are making lots of long-distance calls, that can give useful savings. Unfortunately the Datalink had some problems using pcAnywhere, and after it had established the link, tended to freeze erratically when configured as a Hayes-compatible unit. When exchanging files it posted a couple of good times, but on other occasions it dropped back to 9600 which indicates it could be fussy about line quality. The phone support was competent, but we spent plenty of time on hold.

No software is supplied with the modem, but you can store up to 10 phone numbers in memory hardware. On the long-distance data calls, the Datalink seemed to be as robust as any, and did not drop out at all. It also has Auto-Recovery, which allows it to monitor the line quality and reconnect if problems occurred on the first connection attempt. This could be invaluable for business users who have to get the data through ASAP.

Overall, the Datalink would be an good dedicated line modem for those who want a solid reliable workhorse and are prepared to invest some time in setting up and installing suitable software.

## Banksia BitBlitzer MX5S

When you open up the Banksia box, the



*The Banksia BitBlitzer MX5S was easy to set up and use, and after passing our Hayes compatibility test with flying colours, logged onto the remote station at full-speed in only eight seconds*

## AT A GLANCE

### Banksia BitBlitzer MX5S

**Distributor:** Banksia  
**Telephone:** (02) 418 6033  
**Price:** \$1014  
**In short:** The Banksia BitBlitzer MX5S data modem is easy to use, well engineered and offers good performance.

first thing you see is 'Designed and manufactured in Australia'. That's a good start. Packaged in a neat touchphone-sized black metal casing, the MX5S has a dozen bright little buttons poking through the front casing, a couple of RJ11 sockets and an RS-232 25-pin socket on the back. Construction is robust and well engineered.

The only other details are the power input socket for the external plug in DC converter and a toggle power switch, also on the back panel.

Banksia has obviously gone for the minimalist approach and the result is a neat and solid-looking product.

Setting up is easy, with our novice just plugging everything in and switching on; ready to go as configured. The provision of a decent-length phone cable, and a second handset outlet are both sensible and useful, although the power lead could be longer.

Banksia supplies a basic DOS comms package, QModem, a comprehensive if slightly dry manual, and its own exam paper which shows the results of its quality control test. Our sample seemed to have passed. Although the manual gives all the information required to setup, configure and troubleshoot, it could in no way be described as a hand-holder. A quick look at any Windows software manual will show what is required. A small card Quick Reference Guide is also included.

Once connected, the lights on the front flashed, it beeped a couple of times and was ready to go. Two of the LEDs on the front—marked V32 and EC (error correction)—are particularly useful as they indicate whether or not you are really making use of all that V.32bis power. When we

called the Banksia experts with a simple fault we were dealt with quickly and enthusiastically. Good service.

The Banksia MX5S passed our Hayes compatibility test with flying colours, and logged on to the remote station at full speed in only eight seconds — fast. File transfer and remote operation speeds were in the middle of the performance spectrum, but with no dropouts or fallbacks during transmission. Long-distance connections were established quickly too. The only negative aspect is the lack of any pushbutton dialling or status change facility, but this was more

of a slight grumble given the quality of the rest of the package, rather than a serious complaint. The price tag (official) of \$1014 does seem a bit high — the Interlink sells for half that — but the real street price will probably be a fair amount less than that so the MX5S could still offer good value.

Of all the modems, this one was a favourite due to its simplicity, good status indicators and neat appearance.

Plus, of course, it is locally made. Although not the fastest, it certainly performed well, and should be more than adequate for the keen home or business/power user, as long as you don't pay full price.

## Interlink Fastbit Ibis

This modem is the most 'est' of all the modems we tested. It is one of the cheapest, the fastest, the lightest and the simplest. It does not come in a designer package with lights, bells and whistles, and the manual looks as though it owes something to a photocopier. But performance-wise, it does as much if not more than any of the competition. And it's designed and made in Victoria.

The box itself is grey plastic, which does not look ideal for placing heavy weights on it. It has a stick-on Interlink label on the top, a set of seven red LEDs peeping through windows on the front panel, and the usual sockets on the back panel. As well as power-

## AT A GLANCE

### Interlink Fastbit Ibis

**Distributor:** Interlink  
**Telephone:** (02) 362 4344  
**Price:** \$499  
**In short:** Cheap, fast, light and easy to use. The Interlink Fastbit Ibis delivers on throughput without the hefty price tag.



in, a power switch, and a 25-pin RS-232 socket, there are RJ11 sockets for line-in and phone-out. No REN is given, but one assumes the addition of a handset will not overload the system. The case gives no clues as to the speed of the internals; there are no indicator lights for V.32 or compression.

Although the manual is a long way from a glossy, easy read, it has some useful tips on how to setup, how to optimise and

configure, and even hints on how best to solve problems when using Pick, Unix, Xenix and mainframe communications packages. It also gives examples of different types of operation and setup.

Interlink also packages a couple of software programs in with the Ibis; InterCom and Videotex. There is no documentation supplied with the software. Suffice to say both offerings are spartan and are unlikely to be used by anybody who has just shelled out \$500 on a modem. They will get you going if nothing more. The power supply cord is reasonable length, as is the phone cord. A label on the bottom says the Fastbit has not been tested to AS 3548, and it could cause interference in a residential area. It does have full Aus- tel approval, though.

Internally, the level of

#### Interlink Fastbit Ibis

##### SUITABILITY TO TASK

Business use	<b>GOOD</b>
Home use	<b>EXCELLENT</b>
Data	<b>EXCELLENT</b>
Remote applications	<b>EXCELLENT</b>

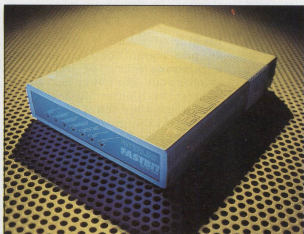
engineering and construction looked good, in fact definitely better than the casing itself. Our call to the technical department was dealt with effectively, but the sales department was not so good and kept us on hold for a long time.

Setting up and running is straightforward. Default Hayes compatibility worked without problems, and once online the connection time lapse is a reasonable 10 seconds. Once

the link was established, the Ibis started flying. Definitely the fastest of the bunch at 3:32 local and a cracking 2:28 to the US. No dropouts or fall-backs were detected, but with the basic indicator and status lights it is hard to tell if any occurred.

Regardless, the times were pretty good. The only niggle with the Interlink is the error control; V.42 hasn't yet reached the Ibis II and it uses MNP4. Luckily, this is the fallback for V.42, so connecting is not usually a problem.

If you are looking for a fast and economical modem that may not look expensive but certainly performs with the best, you should definitely put the Fastbit Ibis on your list.



*The Interlink Fastbit Ibis is a fast and economical modem that sacrifices bells and whistles to keep the price down*

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# Fax modems

**A**lthough the units we reviewed in this issue are confined to pure data transmission, many modems are now coming with fax facilities built-in. For a hundred dollars or so more, you can not only link into the established data services you are currently using, you can send and receive faxes directly from your PC. No paper, very high-quality output; no storage problems, and hard copy only when you need or want it. Other benefits are time saved as no scanning in after printing out is required, more confidentiality as hard copy is only provided when required, and less cost as there are no extra consumables to supply.

Additionally, almost all decent fax software that comes with fax modems has multiple broadcast and timed send capabilities. This means you can send several hundred copies of the same fax at cheap rates if you want to by using the PC's programming ability. Most other parameters like retry, dial-out times, PABX routing and so on can also be accommodated, allowing a personal fax to be used on a non-dedicated line if cost is important.

Most fax modems use the Group 3 fax standard which was originally designed for use at a maximum of 9600bps. This has been revamped into Group 3, V.17, which can fax data at 14,400bps. This can give transmission times down to as low as 10 seconds per page. Although there is a Group 4 fax standard, this is very rare,

and even with the introduction of ISDN communications networks, it is still likely that Group 3 will be the predominant protocol.

And given that currently almost 95 per cent of all fax machines worldwide run using Group 3 standards, you should be fairly safe for a while using that type of unit. Be aware also that modem software and the fax modems themselves can differ within the overall Group 3 classification. There are both Class 1 and Class 2 fax modem classifications, which differ slightly in the way they work, although both operate transparently to the user.

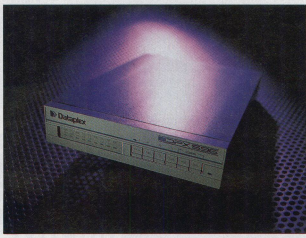
Class 1 fax modems use the PC to perform all the processing required during a transmission session, whereas Class 2 types perform a major portion of the data processing themselves. This means the software you have must support both types is possible. Especially if you are likely to use it on a range of fax modems. Although Class 2 was devised to allow the PC to get on with its job as smoothly as possible without having to deal with modem processing, a good Class 1 fax modem running software specifically designed for it will still be able to run background faxes without noticeable slowing of performance. Especially on anything over a 386 PC. (See also 'Banksia Technology moves in fast with PCMCIA modem for notebooks' on page 182.)

Ultimately, if you have the choice and use a fax, a fax modem unit is well worth considering.

## Dataplex DPX 596

Of all the modems we looked at in our test, this was definitely the most impressive and well presented. From the cooling slots on the back and the three line connectors for various phone jacks, it oozed class. And cost. It is also one of the few to still use ozone-unfriendly expanded polystyrene foam for packaging, and comes with a hefty \$2120 price tag.

As well as being one of the largest in physical size, the DPX had one of the biggest, if not the most attractive manuals. The thin card-bound volume is like many of the others in that it seemed to have been written by statisticians for scientists. A bit dry. Even computer manuals are getting more human; why can't modem manufacturers join in?



From its grey aluminium casing to its built-in power supply, the Dataplex DPX 596 was one of the most impressive data modems we saw

## AT A GLANCE

### Dataplex DPX 596

**Distributor:** Dataplex  
**Telephone:** (03) 210 3333  
**Price:** \$2120  
**In short:** Built for the high-end to cope with the demands of serious online business users, this Dataplex modem is both robust and reliable.

has an on/off switch, a 25-pin RS-232 socket, plus leased line, dial line, and asynchronous terminal NMS socket as well as phone-out. The power lead is long enough to reach further than the end of the desk. All this with a REN of just 0.5.

This obviously gave the Dataplex DPX 596 one of the best options listings for business and professional applications where one-to-one communication of data is required, rather than going through the public network. The sales department seemed a little vague about some aspects of the product when we called, but the technical department had our 'problem' cured in no time.

Installation and setup is straightforward, with the unit acknowledging complete Hayes compatibility as well as its own Octocom extended command set. Octocom is a US company specialising in communica-

### Dataplex DPX 596

#### SUITABILITY TO TASK

Business use	EXCELLENT
Home use	POOR
Data	EXCELLENT
Remote applications	GOOD

tions, and the DPX 596 is in fact a US-sourced design. Log on and dialling seemed slightly slow, but as you don't pay for that, don't lose any sleep over it. Initial connection and link establishment time was a bit slow at 13 seconds, but when transferring our test files they were dealt with more than quickly enough. The time put the Dataplex right in the middle of the speed spectrum, just behind the Hayes. No drop-outs or fallbacks were noticed, and transfer times would seem to bear this out.

No software was supplied with our test version, and the Octocom/Dataplex is not on a lot of software listings, so using it as a Hayes-compatible seems the best bet. Phone number storage is available for dialling preset numbers from hardware, and the manual switch controls also simplify operations from the operator's point of view. Overall, the Dataplex seems to be robust, reliable and very well specified to cope with the demands of serious on-line business users. It would probably be a slight



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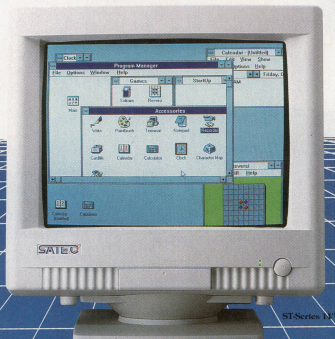
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degree of overkill for the entry-level users, but should be able to cope in most situations.

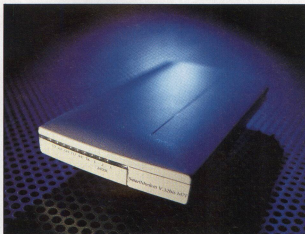
## NetComm M7F

Let's start off with some prejudices. I think the NetComm has the best manuals, really good bundled software, the best design by miles, a good phone line, and the best multifitting RS-232 cable. It also had the fastest and best informed phone response to our queries. That kind of presentation makes you feel good before you plug in.

Other neat features like a power lead you can't accidentally pull out, hidden DIP switches on the front of the unit where you can get at them, and a free introductory membership to CompuServe help sweeten the package even more.

To look at, the NetComm is like a piece of grey Bang & Olufsen stereo—slim line, discreet lights, rounded profile and designer relief on the casing. Mmmm. Definitely the most unobtrusive, it would grace any executive desk and give kudos at the bistro.

Still, you pay for the design work at \$1475 per unit. Installation is as easy on the brain as looking at it is on the eye. The phone cable is one of the sensible in-line units which means you can still have your phone on the same line without bulky adaptors. The power supply is a plug-in type, with a reasonable cable length, and the three-headed RS-232 cable is so good we used it for connecting all the other modems when testing.



*Installation is as easy on the brain as looking at this unit it to the eye*

### ► NetComm M7F SUITABILITY TO TASK

Business use	GOOD
Home use	GOOD
Data	GOOD
Remote applications	GOOD

Reading the installation manual is easy, the information is well presented and easy for the novice user to understand. Top marks. For power users, the reference guide gives all the information you could possibly want about commands, remote operation, testing, troubleshooting and more. Both manuals look good too.

Connected to a Hayes-compatible, in the default configuration as supplied, the speed readout on pcAnywhere was listed as 9600, but nonetheless the transfer times indicate V.32bis being used. So perhaps some slight tweaking is required to give full Hayes emulation. Initial connection times were about 12 seconds, but the transfer rate was lower than some others at an average of

5:04 local and 2:35 international. One fallback was noticed on a local call, but that could have been due to call re-routing. One peculiarity is that when running at 14,400bps, all the mode LEDs on the front panel are off. It would seem logical to have them all flashing.

The Microphone software supplied for use with Windows is a good comms package with all the main features you could want. It also has a reasonable if thin manual, and a customised CompuServe driver disk for Australian users. Nice touch. The push-buttons under the front flap are a bit tiny, but allow Talk/Data switching, or manual speed selection. Front DIP switches control line settings, and rear panel DIPs set modem computer parameters. All are easy to get to and well explained in the manual.

The only design fault (if it is a real one)

## AT A GLANCE

### NetComm M7F

**Distributor:** NetComm  
**Telephone:** (02) 888 5533  
**Price:** \$1475  
**In short:** The NetComm M7F data modem is well designed and has the best manuals of all the units we examined.

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with the NetComm is that a standard touch-phone won't sit properly on the top of it because of its rounded shape. Otherwise, NetComm has to be near the top of anyone's list in virtually every department, especially as it comes with a two-year warranty.

## Maestro 144M

Maestro has been around the modem scene for a while now, and produced many of the modems that first got Australians talking to each other via computers. Designed and made in Australia, the Maestro modems

have always had a reputation for being competitive. The Maestro 144M is no exception at \$559.

In appearance, the unit is a conventional under-phone black box, with a bonanza of 16 LEDs on the front panel, a 25-pin

RS-232 on the back, and a phone-in socket. The only other user-accessible devices are the power-in socket and power switch.

Printed matter that comes with the Maestro includes the manual; a sleek black affair which looks good on the outside but is rather thin inside when compared to the likes of the NetComm offering.

Basic ATD commands and troubleshooting are covered, along with S-Register settings and MNP standard operations details. No installation information is given. Our phone contacts were responded to well enough, but the sales section had a slightly condescending approach, given that we were potential purchasers.

The supplied DOS software, Quicklink II, fares better, with the best software manual of the group. The program itself is competent but looks a bit long in the tooth with some very blocky text displays and screens.

Plugging in and powering up the Maestro gave no headaches. Probably because there are no options; plug in and go. The phone line included has a valuable extra missed by all the other suppliers: a double-ended RJ11 jack as well as the standard Telecom wall plug. This means you can link into other in-line devices such as answering machines without a massive spaghetti of phone lines. The Maestro's REN of 1.0 indicates you could get away with this without overloading the system. The power supply is a bulky external affair, but has enough lead length to allow you to plug it in next door if you want to.

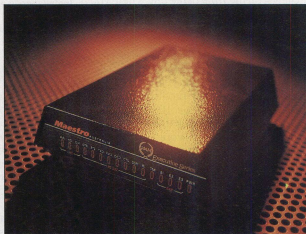
Once the power switch

## AT A GLANCE

### Maestro 144M

**Distributor:** Maestro  
**Telephone:** (06) 242 9755  
**Price:** \$559  
**In short:** On the features list this unit has less than some of the opposition, but at \$599 the Maestro 144M data modem offers good value for money.

is flipped, the 144M duly beeps and flashes and waits for instructions. During this time we realised three of the 16 LEDs labelled



The phone line included with the Maestro 144M has a valuable extra missed by all other suppliers — a double-ended RJ11 jack as well as the standard Telecom wall plug

## What of the future?

**A**lthough the modems we look at here are currently state of the art, given the speed of development and change in the communications industry, they are likely to be old hat within a few years.

The next phase we are likely to enter should be the V.Fast standard, which looks set to speed up modem transmission to between 24,000 and 28,800bps. The chances are these will be the highest speed modems that we will use over the existing public telephone system — partly due to the technical problems of cramming so much data down a line into a system which has more variables in it than vegetable soup, and partly because of the imminent arrival of ISDN (integrated services digital network).

The problems with current methods of transferring digital data are linked to the kind of transmission methods used. These can range from satellite links, through optical cables, underground

cables, digital switching exchanges, manually operated plug board exchanges, PABX systems, and lastly that old copper telephone wire with birds on it outside your window. It's a wonder anything gets through!

Using ISDN, specifically designed to transmit digital not analogue data (as in speech) it is likely the role of modems as we know it will almost disappear. Computing stations in both home and business will be linked into the ISDN network, which will be able to draw direct digital information down the line across a much broader bandwidth than currently available. This will probably include voice, data, video, image and even position data too. All these different data types are likely to be handled by a single DSP (digital signal processor) which will use complex multiplexing techniques to sort out which bit is for which data processing unit. Be it video, numeric or analogue voice.

One other development which must have a significant impact on the way we exchange digital data is the provision of a global satellite network. Already it is possible for one-way communication systems to provide static information to absolutely anywhere in the world. If this capability is linked into the current cellular network to allow two-way communications, hardwired communications links are likely to vanish. All links are likely to be established by cellular and satellite link, irrespective of location or type.

Evidence of this is already on the shelves in the form of Apple's Newton, which incorporates fax, paging, scratchpad and message exchange, all in a handheld unit. All these features are accessible by simply being near another unit with an infrared data exchange unit. Sure, these technologies are slow and need more development, but so were modems back in the days when 1200bps was the fastest on earth.



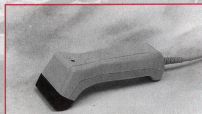
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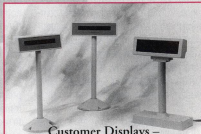
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# Banksia Technology moves in fast with PCMCIA modems for notebooks

BY MARYANNE PHILLIPS AND EARLE ROBINSON

**A**lthough its name doesn't roll off the tongue, PCMCIA is changing mobile computing more dramatically than any technology today. And after years of unfulfilled expectations, we finally have the products to prove it.

Enter Banksia Technology, the first local modem maker to unveil a fast 14,400bps credit-card-sized modem for notebook PCs that handles both data and fax.

Two products have just been released: the \$790 PCM24F and \$1400 PCM144F. The faster of the two products, the PCM144F, offers data speeds of 14,400bps or up to 57,600bps with V.42bis data compression and V.42 error correction. In fax mode, the PCM144F sends and receives V.17 faxes at 14,400bps to and from fax machines or fax cards capable of handling the same speeds.

The PCM24F delivers speeds of 2400bps in data mode, with built-in V.42 error correction and V.42bis data compression to allow throughput speeds of up to 9600bps, and when faxing provides both send and receive at the full 9600bps — the standard of most fax machines. Both PCMCIA data/fax modems are Class II fax compatible.

Actually, NetComm was the first local manufacturer to release a PCMCIA 2.0 card modem for notebooks in Australia. The company's NetComm CardModem 24 — a 2400bps (V.22bis) data modem offering support for V.42, MNP2-4 error correction and MNP5 data compression for an effective throughput of 4800bps — made its debut at the beginning of the year. Pegged as an entry-level product, NetComm plans to release within a few months more powerful cards with fax capabilities, as well as networking options for both Ethernet and Token Ring.

Next month, APC will review Banksia's new fax/data PCM144F PCMCIA card in the First Looks section, while a full review of PCMCIA-equipped notebooks and modems (and other peripherals) will be included in the Mobile Computing guide in the November 1993 edition.

## A little history on PCMCIA

Developed in 1989 by the Personal Computer Memory Card International Association, a consortium of more than 300 manufacturers that includes Apple, IBM and Toshiba, PCMCIA is a completely

open, non-proprietary bus standard that does for notebooks, subnotebooks and palmtops what the ISA bus did for desktop PCs. The compatibility PCMCIA promises — though hardly perfect yet — will allow users to plug any manufacturer's PCMCIA peripheral into your notebook.

Unfortunately, you can expect to pay a hefty premium for these devices. The prices won't remain high, however. As more peripherals begin to reach the market, resulting competition will pull prices downward.

The key to PCMCIA's success is its auto-configurability. Instead of fiddling with DIP switches and configuration programs, you merely pop a peripheral into a slot. The host system automatically recognises it, which it confirms with a single beep.



*Banksia's PCM144F data/fax modem: 5mm thick and no bigger than a credit card to fit PCMCIA type II slots on notebooks*

At least, that's what the specification is designed to do — a confusing array of standards within PCMCIA, which along with the costs involved, explain why the standard has been slow to come to market till now.

There are three, soon to be four, types of PCMCIA slots, each identified by the thickness of the card that fits in it. Type I slots, which are 3.3 millimetres thick, accommodate memory cards only. Type II slots, which are backward compatible, hold cards that are 5mm thick (but otherwise maintain the same form factor as Type I cards) and support full I/O capabilities. Older cards can be used in slots that are thicker, because the guides that seat the cards remain the

same thickness. Only the centre portion of the slot is higher.

Type III slots measure a full 10.5mm thick, and they're designed primarily for removable hard drives. Type III is also backward compatible. Type IV slots, which will begin to appear in notebook computers by the end of the year, will accept even thicker hard drives, though the exact size hasn't yet been settled.

There are also two versions of the standard itself. Release 1.0, published in 1991, was for memory storage devices, such as those found on the Poqet PC and HP's 95LX. With Release 2.0, announced in 1992, PCMCIA slots got full I/O capability, which enabled them to accept modems, fax modems, and LAN adaptors. Release 2.0 also permits the cards to derive power directly from the socket and provides for an execute-in-place (XIP) layer, which permits the system to execute a file directly from the card instead of loading it into RAM first.

Meanwhile, Intel has added an extension to the PCMCIA specification, Exchangeable Card Architecture (ExCA), to ensure that PCMCIA cards are interchangeable on systems using Intel CPUs. As more card makers work with system manufacturers, incompatibilities will be ironed out.

The PCMCIA specification uses a 68-pin connector, with power and ground pins that are long and therefore accessed first. The basic software interface, called Socket Services, uses a set of function calls that work at the same level as the system's CMOS. This gives hardware-independent access, as if the interface were the BIOS of the computer. Though the specification for Socket Services was defined to be part of the computer's BIOS, many system manufacturers implement it as a device driver. Manufacturers who take this shortcut risk making their machines incompatible with many PCMCIA cards.

The programming interface for PCMCIA, called Card Services, provides the calls to link Socket Services to the operating system and applications. Card Services can be implemented either in the operating system, as IBM did for its version of DOS 6.0, or as a driver. Each card must identify itself to the host system, providing it with relevant information about how the card functions.

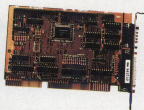
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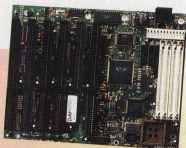


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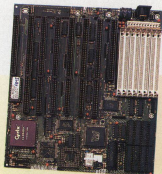
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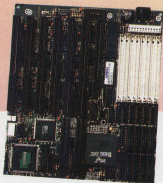
ISA Super IDE Cards  
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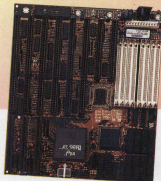
ALD 386SX-40 Isa  
Motherboard



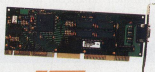
OPTI 486DLC-25/33 or  
386DX-40MHz Isa  
Motherboard



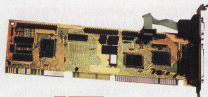
SIS 486SX/DX2 - 25/  
33/50/66MHz Vesa Local  
Bus Motherboard



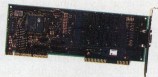
OPTI 486SX/DX2 - 25/  
33/50/66MHz Vesa Local  
Bus Motherboard



Trident TVGA 9200Cxr  
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## Summary of features: data modems

	<b>Datalink 14.4</b>	<b>Banksia BitBlitzer MX55</b>	<b>Interlink Fastbit Ibis II</b>	<b>Dataplex DPX 596</b>	<b>Netcomm M7F</b>	<b>Maestro 144M</b>	<b>Hayes Optima 144</b>
Distributor	Scitec	Banksia	Interlink	Dataplex	Netcomm	Maestro	MPA
Phone	(02) 428 9555	(02) 418 6033	(02) 362 4344	(03) 210 3333	(02) 888 5533	(06) 242 9755	(03) 724 4444
Price	\$1709	\$1014	\$499	\$2120	\$1475	\$559	\$1144
Warranty	1 yr	1 yr	1 yr	1 yr	2 yr	1 yr	1 yr
Size (WxDxH)	245x255x60	130x190x37	180 x 230 x 43	205 x 280 x 45	123 x 220 x 30	160 x 215 x 50	140 x 240 x 35
Format	Large Desktop	Small desktop	Small desktop	Large desktop	Small desktop	Small desktop	Standard desktop
External Power	Yes	Yes	Yes	No, internal	Yes	Yes	Yes
Phone Cable	RJ11, RJ45, piggyback	RJ11	RJ11	RJ11	RJ11, piggyback	RJ11, double end	RJ11, piggyback
RS232 Cable	No	No	No	No	Yes	No	No
Sockets	RJ11, RJ45 x2	RJ11 x2	RJ11 x2	RJ11 x2, NMS	RJ11	RJ11	RJ11 x2
Manuals	One	One	One				
Software	No	Qmodem	Intercom, Videotex	No	Microphone	Quicklink	Smartcom
Packaging	Cardboard	Cardboard		Card, polystyrene	Cardboard	Card, bubble pack	Foam, cardboard
Panel Display	LCD alphanumeric	LED	LED	LED	LED	LED	LED
No. of lights	n/a	12	7	9	9	12	8
Panel Switches/Front Pushbuttons	Yes	No	No	Yes	Yes	No	No
Performance							
Local 256k File	5:20	4:26	3:32	3:40	5:04	5:40	3:36
U.S. 128k File	2:40	2:43	2:08	2:20	2:35	2:30	3:92
Hayes compatible	OK on data	Yes	Yes	Yes	Yes	Yes	Yes
Connection time	8	8	10	13	12	14	12
Ease of Use	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
Support	●●●	●●●	●●●	●●	●●●●	●●	●●●●
Comments	RJ45 line only for public networks		No V.42 or V.42bis, MNP4 only				Some bug in this version
●●●● — Excellent, ●●● — Good, ●● — Fair, ● — Fair							

EXP didn't do anything. Connection establishment time is one of the longest at 14 seconds, and although the times for the local file transfer were relatively slow at 5:40, the longer distance, smaller file links were reasonable at 2:30. Why is not clear, although fall-backs could not be directly ascertained due to the High Speed Link only coming on over 4800bps. No difficulties were encountered using the 144M as a Hayes-compatible, either on link establishment or command information by way of ATD instructions. This bodes well for use with a wide range of software.

On the features list, the 144M has less than some of the opposition, with built-in diagnostics, and storage of 144 digits (this equates to four telephone numbers) in non-volatile RAM. No push buttons ease the tasks of speed, voice or ATD command

switching. But when you compare performance for price, the Maestro is still good value.

### Hayes Optima 144

What can you say? Hayes established the standards, has kept them going, and still produces modems as good as you can get. Obviously 100 per cent Hayes-compatible, the Optima 144 is a solid and fast performer. It's just a shame it looks like a toaster that has fallen over. Our review sample had been around a bit, and came packaged in little more than a plastic and cardboard wrapper held together with sticky tape. I presume the retail versions are better presented. Likewise, the manuals seemed to have gone walkies, but previous ex-

perience with Hayes products indicates they should be well written, informative and big — although they can get a bit technical.

To make up for the lack of manuals, Hayes bundled Smartcom for Windows with the test unit. This software must be as good and easy to use as any comms

### AT A GLANCE

#### Hayes Optima 144

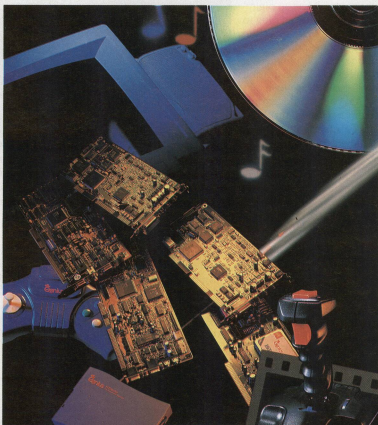
**Distributor:** MPA

**Telephone:** (03) 724 4444

**Price:** \$1144

**In short:**

A solid and fast performer, the Hayes Optima 144 sets the pace that others must follow or beat.



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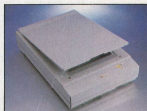
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software on the market. The other good thing about Smartcom is that the manuals gave the lie to the idea that comms documentation, by definition, has to be technical and dry as dust. Far from it—the Smartcom manuals have to be the best by far for general reading.

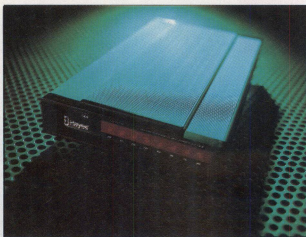
The Optima 144 has eight LEDs on the front panel of a casing which is curiously shaped to be totally impractical. While looking as though it will be perfect for the task, it is impossible to rest a phone securely on it. The overall design is minimal; in fact, the Hayes looks a little dull on the outside. Inside is just one circuit board with a couple of add-on daughterboards covered in surface-mount chips. Our version had something of a rattle on receipt, but this didn't stop it working. The phone support staff at MPA were helpful and courteous when we queried this and a couple of other points.

The back panel is sparse in fixtures; just a power in, on/off switch, 25-pin RS-232 and two RJ11 phone jacks. There is one bank of DIP configuration switches, but you need to delve inside the casing to get at those.

The external power supply

is enormous, with warnings in several languages on the bottom. Plenty of line length is available both on the phone line and the power leads. The phone lead has a piggy-back type Telecom plug to allow doubling up at the same phone point, and a phone can be plugged in to the extra RJ11 on the unit itself. No REN is given.

As you would expect from a Hayes modem, Hayes compatibility was achieved without trouble when using software setups. The Optima 144 logged on obligingly, dialled quickly and took an average of 12 seconds to establish a V.32bis link at 14,400 according to the PC screen readout. The High Speed indicator light also flashed to confirm this, but no LCD readout is provided to give exact details. Sending our files locally gave a good 3:36 time standard with no fallbacks. In-



The Optima 144's back panel keeps features to a minimum—a power in, on/off switch, 25-pin RS-232 and two RJ11 phone jacks as well as DIP configuration switches inside the casing

#### ► Optima 144

##### SUITABILITY TO TASK

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ternational links seemed to have some trouble and dropped out a couple of times. On checking with the suppliers, we learned there are some possible bugs on this version, but these are due to be fixed by the time the next shipment is received. We hope so.

If the problems are sorted out, the Hayes should still provide good value in comparison to the rest of the field, even at the list price of \$1144. ☎

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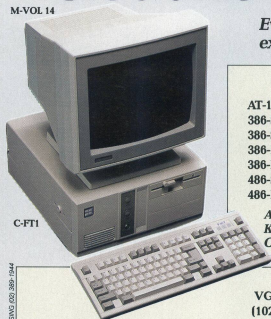


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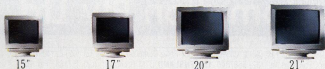
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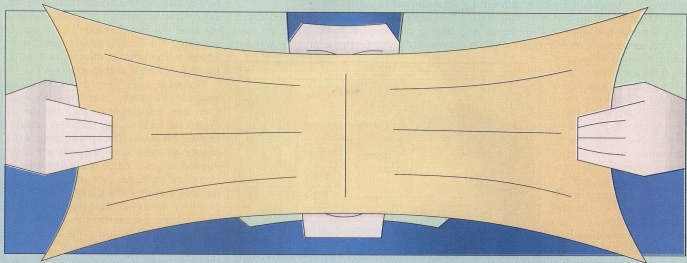
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# Suite on DTP

*VSI's complimentary software to its long-running Ventura Publisher DTP package, makes some valuable additions to Ventura's capabilities, at a price.*

BY JIM ENDERSBY

**T** Ventura Software Incorporated (VSI), producer of the successful Ventura Publisher page-layout program, recently released a series of new products, designed to complement Ventura itself and to provide desktop publishers with a complete software solution. The two new programs – AdPro and PicturePro – like the new Version 4.0 of Database Publisher, are clearly designed to extend Ventura's capabilities into new territory where software from other manufacturers has previously been dominant.

## Ventura AdPro 1.1.1

This is a powerful and feature-rich page layout program, particularly suited to producing complicated adverts. AdPro is a new version of a long-established program called Archetype Designer, which has been 're-badged' and updated by VSI. The package carries a recommended retail price of \$995.





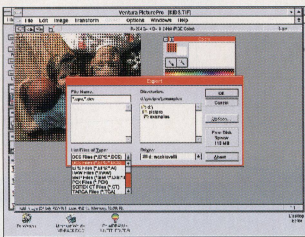
Anyone who has used the original Archetype will be aware of what a frustrating program it was; a combination of powerful, well-designed features and irritatingly complex, non-standard ways of doing things. In its new incarnation, as AdPro, it's a much better program with many improvements, one of these being that it now uses standard Windows fonts (originally Archetype had a proprietary format). Less impressive is the 'new' documentation; Archetype's manual was very trying and while AdPro's has been improved, it still isn't up to VSI's usual efficient standards. For example, VSI has retained the alphabetical order of the original manual — which is useless if you don't know what a feature is called.

AdPro does have some very appealing features. For example, you can click on any object — text or image — and click the right mouse button; up pops a dialogue box which specifies every conceivable property of the object and allows you to change any or all of them. An aspect of this that I particularly like is that you can set the width of a text column directly by specifying its measure. For anyone with a traditional typesetting and paste-up background, most page make-up programs work back to front — they force you to specify margins and page dimensions instead of column widths. AdPro's ability to specify text measure — and to position both text and other elements by precise co-ordinates — makes it easy to set up ads with complex alignments.

Less appealing are one or two of the original program's eccentricities which have unfortunately been retained. Most irritating of these is that the program still doesn't 'feel' like a Windows application. Like Ventura Publisher itself, AdPro began as a GEM application and doesn't appear to have quite finished migrating to the Windows environment. One example of this is the AdPro screen, which doesn't have any tool icons visible; instead it has a second window, cryptically titled 'TAGS', floating outside the main window (and why, oh why is this a text list? Isn't Windows supposed to be a *graphical* interface?). These tags are in fact AdPro's tools, used for defining everything from text styles to page sizes. When you click on one the mouse pointer changes shape to tell you which tool you've selected. These tags are actually one of AdPro's most powerful features, because you can define your own, allowing you to create complex objects, such as starburst flashes, with a single click. Un-

fortunately, the way they are presented is confusing and forces you to learn a new way of doing things.

Overall, AdPro is still a bit too specialised, forcing you to learn to do things its way, instead of attempting to be intuitive. And yet,



*PicturePro supports a very extensive range of export formats, allowing you to use it with many other applications besides Ventura Publisher*

despite its limitations, AdPro has some very sophisticated typography and layout tools. Its design tools, such as precise rotation and alignment of graphics and text, are potentially the perfect complement to Ventura Publisher's own long-document features. However, the two programs will need to work together a bit more closely if they're going to be a real success.

## Ventura PicturePro 1.1

Retailing at \$1195, PicturePro is an unusual image editing program which combines painting tools (such as those in Letraset's Painter), with image editing tools (such as those in Adobe's PhotoShop), along with

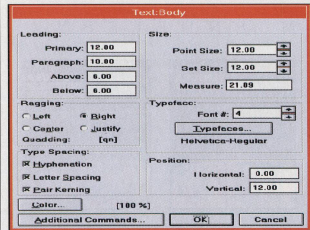
vector drawing tools, similar to those in CorelDRAW. This somewhat unlikely combination allows you to take bitmapped images (either scans or original paintings) and combine them with vector-based text or drawings. The drawn elements can then be added to the scan as images, or used as masks for filtering and special effects.

Not surprisingly, given the range of tools available, PicturePro is not easy to learn. Even after going right through the manual once, I still feel I've only mastered a third of its potential power. The options available for paintbrush styles alone are positively dizzying and a similar range of choices exist for every one of PicturePro's many tools. The painting and retouching tools include support for pressure-sensitive digitising tablets, so that you can define brushes that produce thicker lines when you press harder, and change colour when you draw faster. The drawing tools, however, are much more limited; they consist of basic line, circle, square and ellipse tools, but can be supplemented by importing drawings from a more sophisticated drawing program, such as Illustrator.

PicturePro's text tools are businesslike, but unspectacular. The program allows you to use any TrueType (or if you use Adobe Type Manager) PostScript font installed on your system, but while it supports basic alignment, rotation, scaling and spacing options, it doesn't allow you to fit text around a circle, for example. Once again this shortcoming can be overcome by importing text from another program, but that rather undermines PicturePro's claim to be a complete image-editing and creation tool.

PicturePro contains an Alpha channel layer, as well as the drawing and painting layers, which allows you to create various types of transparent images and masks. This opens up almost limitless potential for combining multiple images, including any you might want to import from specialised image creation programs.

The main drawback to PicturePro is that the final output must be a bit-mapped image, which means that any vector-based drawings you've done (or imported) have to be rendered as bitmaps before they can be exported. This means that you lose the strongest feature of any vector-based program; the device-independent output. Instead the drawn elements are really only usable as masks for bit-maps; which is useful, but not as sophisticated as the combination of tools you have with CorelDRAW and its bundled image-editing



*One click of the right mouse button, and AdPro allows you to inspect and edit any of an object's properties*



program, PhotoPaint. Like many 'all-in-one' programs, PicturePro may prove too complex for beginners and not quite flexible enough for professionals. The price is pretty steep when compared with the competition and unless the unusual combination of drawing and painting tools is one you really need, PicturePro is not likely to appeal.

## Ventura DataBase Publisher 4.0

Vast quantities of information are now stored on computers, and as database software keeps getting cheaper, it's inevitable that desktop publishers will receive more raw data as database files rather than word-processed text. VSI has clearly foreseen this and in its DataBase Publisher it has created a superb tool for getting the information out of a database and then typesetting and designing it with maximum efficiency, minimum aggravation and no programming.

The concept behind DataBase Publisher is relatively simple. Databases contain structured information; a number of records, each consisting of various fields. This structure is used to define how the printed document should look. For example, you are publishing an internal telephone directory using your company's employee records. You specify which fields to include in the phone directory (such as employee name, department and phone extension), and which to exclude (such as Tax File number). You can re-organise the information in any way you like; by sorting it alphabetically, for instance. Then DataBase Publisher extracts the information and formats it (by matching various style tags to specific fields). The formatted text is then loaded into a page make-up program (Ventura Publisher offers the most comprehensive features, but PageMaker, Word for Windows, WordPerfect and AmiPro are also supported). All you need to do with your page layout software is a little tidying up — and your directory is done.

You can define, and save, various 'recipes' for extracting and formatting data which allow you to produce several versions of the same information, and makes updating next year's directory child's play. The recipes can take advantage of user-defined macros and dictionaries to automate repetitive tasks, like changing capitalisation of names, or substituting the full names of your company's departments for the abbreviations stored in the

database. Directories and catalogues (which can automatically include scanned photos, all anchored to the correct point in the text) are an obvious use of the program, but all kinds of structured documents can be produced. For example, the University of New South Wales has started getting some of its official publications — such as student

Base Publisher. Of all these new Ventura products, DataBase Publisher is easily the best, perhaps because VSI appears to have done all the programming inhouse. Important details, such as the clarity and ease of use of the help system, are significantly better than their equivalents in PicturePro and AdPro. And with a recommended retail price

of just \$449, it's also superb value for money.

## Conclusion

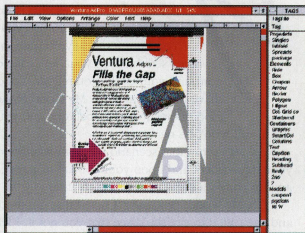
One key benefit of Windows is that it should provide users with a consistent interface; making it easier to learn new programs. In theory, we should be able to pick up new Windows programs much faster than we could DOS programs, but these four applications sport four entirely different interface designs. If we can't get consistent interface design from one company, what chance have we of getting it from several?

Inconsistent interface design is a symptom of the

only really big problem with these new releases; they are four very different programs — licensed from different developers — and have not been properly integrated. Of the four programs, only Ventura Publisher supports Object Linking and Embedding (OLE), Microsoft's standard for linking data from different applications, would have been the obvious way to tie these programs together into a real suite of publishing software. As they stand, the only way to bring images from PicturePro, or ads from AdPro, into a Ventura chapter is to export them as, for example, EPS files and load them into frames. This process has to be repeated each time an ad or image is updated.

If VSI can add OLE support to the next version of these applications, the company may have a genuinely unbeatable combination of tools on its hands, particularly if it releases them as a bundled 'Publisher's Powerpack', as done in the US. For the moment, this combination of software doesn't quite succeed in plugging the gaps in Ventura's abilities. DataBase Publisher is a superb bargain, and very tightly integrated with Ventura, but the other two will need a bit more work if they're really going to make a splash. These Ventura products are all distributed by Merisel, telephone (02) 882 8888.

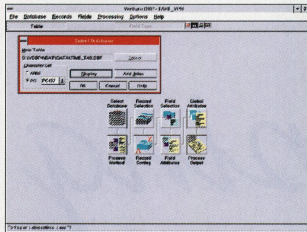
*Jim Endersby is the Publications Officer at the University of NSW*



*AdPro's appearance is awkward and very 'un-Windows-like'. The floating window on the right, labelled 'TAGS' is actually the program's toolbox*

handbooks — onto databases, primarily so that DataBase Publisher can be used to produce them. The handbooks consist mostly of subject descriptions which all have a common format — an ideal opportunity to set up a database and automate the publishing process.

The really remarkable thing about DataBase Publisher, however, is that despite giving you the speed and ease of genuine 'push-button publishing', you don't have to compromise when it comes to the design of your final document — anything you can do in Ventura Publisher, you can do with Data-



*Nothing to do with databases is ever easy, but Ventura DataBase Publisher is designed to make publishing a database as painless as possible*

Y

ou're compiling a report when your phone rings. A vaguely familiar voice says, "Ms Jones, this is Bob Wood. I'm following up on our conversation of October 15. Do you have that price quote I requested yet?"

You hunt frantically through the messages taped to your CPU, the notes scribbled on your wall calendars, and the loose papers scattered around your desk. You tell Mr Wood that you have the quote, but you'll have to call him back. Mr Wood replies that he's already received several good quotes from competitors, and yours is a week late. You're told that the return call won't be necessary.

Now let's rerun that scenario with one alteration. Mr Wood calls. You quickly minimise your spreadsheet and open your contact manager. You search for the name 'Bob Wood', and up comes a screen full of information.

"Yes, Mr Wood," you say. "I faxed that quote to your assistant, Norma, a week ago, and she called to say she'd see that you got it. I left a message with her on the 18th, asking if you'd made a decision yet. By the way, how's your son's first year at Stanford going?"

Mr Wood mumbles an apology, thanks you for asking about his son, and says he'll track down that fax.

While we tend to associate contact management with salespeople, other professionals whose work requires quick access to detailed records of interaction with people and companies – like head-hunters and fundraisers – have helped swell the ranks of contact-management software users in recent years. Evolving in the 1980s from products like Lotus Agenda, software for managing loosely structured information now makes up two arguably distinct classes: PIMs (personal information managers) and contact managers. While both employ contact databases and calendars, PIMs focus on a loosely structured organisation of time and projects. Contact managers, by contrast, tend to use more heavily structured databases to record contact information and histories. Further, these complex database and search capabilities let contact managers massage data in ways most PIM users can only dream about.

# Keeping in

Photography by Christopher Gould



# touch

B Y K A T H Y Y A K A L

*They're not just for salespeople any more: today's powerful, easy-to-use contact managers offer effortless relationship tracking to the whole range of people-oriented professionals.*





## ■ ACT! for Windows

While there is a core of commonality between contact managers and PIMs (personal information managers), we see a clear difference in emphasis. PIMs focus on series of activities, usually loosely tied to a schedule or address database. Contact managers, on the other hand, primarily address people, associations and history.

Of the five products we culled for this roundup, the one that best handles the tasks of managing and massaging contact information is Contact Software International's ACT! for Windows, which has been awarded the Editors' Choice.

We judged ACT! to be the best standalone (non-networkable) contact manager, notable for its finely honed interface and resultant ease of use.

Another Windows-based contender, Richmond Technologies & Software's Maximizer for Windows, earned an honourable mention. Having made the leap to Windows, this package shows great improvement over earlier versions and real potential as a top-notch contact manager.

### Polished ACT!

ACT! for Windows performed very well on our tests. Combining powerful contact-database and history functions with an easy-to-use graphical interface, ACT! for Windows makes good use of the inherent strengths of the Windows environment. It offers DDE (Dynamic Data Exchange) links to other productivity apps and uses drag-and-drop for its nifty scheduling feature. The latter lets users easily link appointments with contacts and store all pertinent information to a contact history log.

While users can easily connect to external word processors, ACT! for Windows' built-in text handler is no slouch. It lets users adjust both layout and typography, add formatting options like headers and footers, and import graphics through the Clipboard. ACT! for Windows also offers links to the HP 95LX Palmtop PC, an important consideration for users who travel. ACT! fell short only on our Extensibility task, mainly for its inability to run on a network.

Maximizer for Windows earns plaudits as a striking first entry into the Windows arena. It leaves behind many of the problems associated with its DOS predecessor — such as screen clutter and an inability to let users see the big picture. Despite an interface that occasionally requires the user to engage in minor keyboard and mouse gymnastics, and a notable inability to log initiated or completed tasks, this program's underlying contact structure — unlimited personal contacts grouped under client companies — makes for a logical and efficient organisation of contact information. Unlike ACT! for Windows, Maximizer for Windows is network-aware. It also uses far fewer system resources. A little more spit and polish on Maximizer for Windows' hood, and ACT! for Windows may find itself staring at a bumper.

We narrowed down the candidates for this article by requiring that products offer some automatic logging capabilities, include free-form notes fields, have a built-in word processor or a link to an external one, offer a task list/calendar, and cost under \$1600.

As we went to press, Australian developer Softcode released the latest version of its Tracker contact manager, Tracker for Windows. The new version includes a swag of extra features over the DOS originals, including updated time manager, word processor, charting and integrated on-line email services. To underline the move away from a pure PIM platform, it also bundles a booklet titled 'The PC as a Marketing Tool'. We shall be reviewing Tracker for Windows in an upcoming issue.

### Contact-intensive solutions

Compared with what you can fit in a Rolodex, address book, or business-card

file, you can stuff a tremendous amount of information into a contact manager. More important, you can organise and recombine that data into powerful reports. In fact, for many users, the contact manager serves as a base of operations — the one application they run all day.

Contact managers make manual data entry as easy as possible. Some offer editable 'pick lists' of commonly used responses ('sent quotation' or 'returned call, left message', for example). Most let you establish field defaults, so you can copy all or part of an existing record and edit only the fields that differ.

For those switching contact managers (or converting contact data over from a commercially available database), data import is critical. Fortunately, most current contact managers import and export data in ASCII and dBASE formats. A few offer additional options, including direct import from competing products. Whether you're

starting from scratch or converting, the best products let you attach more than one person to a contact record.

### Learning from history

One of the most compelling reasons to use a contact manager is that it maintains a complete history of your interaction with people and companies. Good contact managers can log phone calls, meetings, correspondence, store free-form notes, and prompt you to create reminders to follow up on calls and letters. So if you see an entry on your calendar that says, 'Call Jim B today', but you neglected to note the reason for calling, you can pop up Jim B's history log to review your last interaction.

In most cases, finding a record by searching on a single indexed field ('last name', for example) takes one second or less. But contact managers also offer more powerful functions that let you set complex search criteria.

Some, like ACT! and ACT! for Windows, let you look for a keyword anywhere in the database. This means you can search for, say, the word *lightbulb* in almost any context in the database — whom you've discussed them with, for example, or companies that manufacture them.

Most contact managers let you define highly specific searches using Boolean logical operators (*AND*, *OR*, and so on). You might use these either to create tightly targeted mass mailings or phone campaigns or to develop demographic profiles of your client base. However, since they involve non-indexed fields, such searches tend to be slow.

### Staying in touch on paper

All of the contact managers reviewed here offer a way to produce written correspondence, through either an internal word processor or a link to your outside word processor. A few of these packages offer both — an optimal solution. This makes simple document preparation fast and easy, and gives you the power, formatting options, and familiarity of your own word processor.

You probably already have a word processor, but creating letters in your contact manager's internal editor can have advantages. The recipient's name and address, the date, and a salutation and closing can be automatically positioned on the letter and automatic notation of the letter can be stored in the recipient's history log. Many contact managers can also do quick and easy mailmerges for mass mailings. Moreover, most of these programs include fax support. Some packages simply print a cover sheet for transmission on a fax machine and record the transmission; other packages fax directly from the program with a supported fax board.

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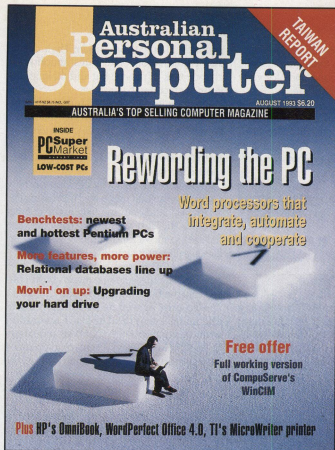
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## Sharing data

You'll find that you occasionally need to share data stored in a contact manager with other people. All of these products include report generators. While some limit you to a fixed set of prefabricated reports, the best packages let you define your own.

For more sophisticated data sharing, though, LAN support is crucial, and a few products we looked at excelled in this area. Since contact data can contain personal or sensitive information, some products provide security for individuals, allowing them to protect their crucial information by hiding all or parts of some of their personal records of databases.

## Windows to the future

Windows has been a real boon to contact management. Task switching is easier. Products that are MDI (Multiple Document Interface)-capable can show contact infor-

mation, history and notes simultaneously. As a DDE (Dynamic Data Exchange) server, a program can act as a phone book for your fax or communications software.

Two of the products reviewed here have begun to tap the power of Windows, while others are rapidly moving in that direction. In the meantime, you don't have to be in the Windows environment to provide first-rate contact management.

### ACT!

### ACT! for Windows

By Kathy Yakal

There's good reason for ACT!'s ongoing dominance of the contact management field. Both the DOS and Windows versions (\$599 each from Symantec) offer a comfortable balance of out-of-the-box usability

and individual customisation. Their design and combination of features simplify the chaotic task of organising and maintaining your contact database.

Despite its wealth of features, ACT!'s interface remains uncluttered. Pull-down menus (and icons in the Windows version) divide functions into logical groupings. Both versions offer either keyboard or mouse navigation.

You add a contact by clicking on new Contact in the Edit menu (or by pressing the Insert key) and entering data in the contact screen. Hit Tab or Return (or click the mouse) to move among the fields. Pop-up lists significantly simplify data entry.

Each ACT! record is presented on two screens. The first screen contains basic contact information (name, company, address, and so on), as well as information about upcoming events and the last interaction with the contact; it also contains nine user-defined fields. The next screen holds space for a second address and phone number for

## Suitability to task: contact management software

In evaluating these five contact managers, we identified four critical areas to help us separate the best products from the merely good: contact database, scheduling, correspondence and extensibility.

The heart of any contact manager is its **contact database**. Since most users these days already use some sort of electronic phone book or mailing-list utility, and since no one wants to re-key data, step one in our testing procedure was importing an ASCII database of more than 1000 records into each package. We noted a package's ability to import data directly from a competing product.

We also sliced information into secondary databases, a procedure that is useful if you want to maintain a category separately ('all Melbourne clients', for example). We then looked for the ability to create contact groups within a database.

One key test for a contact manager is how well its designers were able to handle the fundamental trade-off between cramming lots of information onscreen and keeping things readable. Our evaluations of this aspect were necessarily subjective.

While the information content of the 'perfect' contact screen depends on your specific needs, there are certain fields — such as company name, contact name, contact address, and multiple phone numbers — that any good program should have. Accordingly, we noted each program's standard fields. In order to adapt to personal needs, however, a contact manager must also offer a way to store and find user-defined information. We probed the depth and ease of each package's customisability.

Every time you deal with a new contact, you should enter a new record into your database. We tested the ease of entering data and duplicating entries (the latter procedure often saves time when data between records overlaps). We also explored procedures for deleting contact records.

Ultimately, the most important mission of a contact manager is to find the data you need when you need it. For this reason, we thoroughly tested each package's search capabilities. A critical consideration here is how many fields — and which ones — are indexed for 'instantaneous' retrieval. (For more information on each package's indexed fields, see the table 'Indexing: quick search power'.) We also administered a series of tests involving searches across single and multiple non-indexed fields, as well as more complex Boolean searches.

Reporting is another important way of putting the information in your database to work. We tested each product's ability to output reports in a variety of printed formats, including calendar, phone directory, past and future activity report, and full contact record. Where possible, we also printed mailing labels from our test database.

Contacts are not maintained solely by phone; face-to-face meetings are often important. Accordingly, we administered a series of **scheduling** tests to evaluate each package's prowess at scheduling meetings, tasks and phone calls, as well as its ability to tie them to one or more contacts. We also looked at the packages' calendar systems, focusing on ease of data entry, clarity of appointment displays, and ability to resolve conflicts.

Also vital is a contact manager's ability to keep

Product name	
SUITABILITY TO TASK	
Contact database	POOR
Scheduling	FAIR
Correspondence	GOOD
Extensibility	EXCELLENT

a complete and accurate history of contact interaction. Ideally, a package should automatically record each phone call, meeting, and piece of correspondence, offering you the option to add details easily. We checked to see how close each package came to this ideal. Since contact managers are natural sales tools for professionals, we also looked at telemarketing script support.

Written correspondence, faxing and email are parts of maintaining contacts, too. Under **correspondence**, we evaluated each product's integrated internal word processor or its links to external ones. We tested for the ability to draft quick letters, check spelling, and create mass mailings by mailmerging form letters; links between contact information and the word processor are paramount here. We determined whether the name and address of the currently displayed contact were automatically added to the form letter retrieved, and whether the sending of that letter was automatically recorded to the contact's history log. We also tested links to internal and external fax engines and LAN-based email.

**Extensibility** is a contact manager's ability to operate in a wider domain than a single desktop, either through a LAN or remotely, via a laptop or a notebook. To evaluate this, wherever possible we installed products on a network and shared the databases among multiple users. Issues here were database integrity (record locking) and data security (privacy).

In the context of portability, we considered the amount of RAM and disk space required to run each package and its ability to *synchronise*, or reconcile, two or more versions of the database.



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ASP's answer was to design a Portable Barcode Reader that was able to function as an ordinary fixed barcode reader AND a battery powered portable barcode reader with large memory. All in the one versatile unit.

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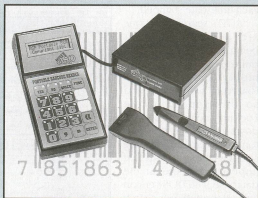
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the contact, names of two alternative contacts, six additional user fields, and other important information. Each screen is easy to read, and the user can quickly move between them by pressing F6.

ACT! for Windows offers eight alternative layouts from minimalist (Rolodex) to maximalist (Large Monitor). Users can't design their own layouts, however. If you already have a database, you can import it in ASCII or dBASE format, though this process is much simpler in the Windows version since it offers a point-and-shoot mapping feature to reconcile different field orders. ACT! for Windows can also import most data from other packages, such as Polaris Software's PackRat, Richmond Technologies & Software's Maximizer, and Lotus Organizer. And both versions exchange data with other ACT! and 1stACT! databases.

When a contact's profile changes, simply make the changes onscreen. If several contacts from the same company require identical changes, you can search for them and make the changes across all the records simultaneously. If you want separate records for several contacts that share attributes (like company and address), you can create a new contact form that duplicates any field you specify and lets you make changes.

## Past perfect

Contact managers should keep detailed, accessible histories of client interaction. ACT! handles this beautifully. Select History from the View menu and you see a list of entries or changes made to any field that's been defined as a History field, each time/date stamped.

ACT!'s search functions are powerful without being so complex as to require programming. Commonly used searches (based on name, state, and so on) appear in the Lookup menu. The Windows version lets you customise this menu, offering searches for keywords that appear anywhere in the database. The DOS version zipped through our search routine. The Windows version's query engine, on the other hand, tested considerably slower. Both ver-

sions also perform Boolean searches.

## Reconciled

If you've loaded your ACT! database on a portable computer, the program's Merge feature will transfer the data back into your desktop, updating your home database. Both ACT! versions also have easy two-way links to the HP 95LX Palmtop PC.

ACT! simplifies the process of scheduling appointments, tasks to do, and phone calls. Pull down the Schedule menu, click on the desired type of event, and a calendar, clock, and list of activity types pop up. Here, you can schedule events and tasks using only your mouse (or you can enter them manually). All activities are entered into the contact's record and can be set to prompt you with an alarm and user-defined reminder.

In the Windows version, you can prioritise tasks, schedule recurring events, and carry undone tasks forward.

## ACT Write

ACT! also automates your correspondence. The Windows version really shines here. While it offers DDE (Dynamic Data Exchange) links to Windows word processors, its internal word processor includes features used most often in letter writing. You can specify type sizes, layouts and type attributes; add formatting options like headers and footers; and import graphics through the Clipboard.

If you have the correct fax hardware (the DOS version supports Intel Corporation's

## AT A GLANCE

### ACT!

#### ACT! for Windows

**Distributor:** Symantec

**Telephone:** (02) 879 6577

**Price:** \$599

**Requires:** DOS version: 640K RAM, 2M hard disk space, DOS 3.1 or later. Windows version: 3M RAM, 2.5M hard disk space, Microsoft Windows 3.0 or later; mouse is recommended.

**In short:** Available in both DOS and Windows versions, ACT! enjoys a continuing popularity that is well deserved. Novices can use either package straight out of the box with little setup, and more experienced users can customise the look and feel. The logical, clean user interface makes data entry and searches easy, and additional features simplify making and recording phone calls, writing letters, sending faxes and compiling reports to get an overview of contact history.

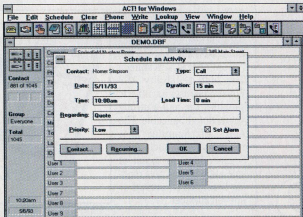


SatisFAXtion Modem and Hayes Microcomputer Products' JT FAX cards) and software (ACT! for Windows has a DDE link to Delrina Technology's WinFax Pro), you can send the document out as a fax. More important, you can use ACT! as your phone book for WinFax. Mailmerges are simple. All you need to do is define the group, write the letter, and print. You can even print envelopes and labels. ACT! for DOS comes with an add-on program that prints in additional formats such as Rolodex cards and DayTimer pages. Both versions offer nine predefined reports (including Activities Completed, Future Activities and Status Reports) and an unlimited number of user-defined reports. Currently, only the DOS version runs on networks.

Rather than trying to emulate ACT!, many contact manager developers have tried to excel by making products that are different and focusing on their individual strengths and designs. Yet ACT!'s universal appeal (it currently has 85 per cent of the DOS market and 85 per cent of the Windows market) and powerful simplicity are likely to keep it a favourite.

## Commence

By Kathy Yakal



*Scheduling activities in ACT! for Windows is simplified by pop-up calendars and drop-down pick lists*

Though Jensen-Jones' Commence (\$599 available through GUI Computing), is regarded more as a PIM (personal informa-

# Contact managers: search capabilities

**V**irtually every vendor of contact management software would agree that when it comes to performance, the most critical element is search speed — how quickly you can get to a record. Each program we reviewed includes preselected fields that are indexed for fast looks. Users typically want to execute searches based on company name, contact name, city, state, postcode or phone number. The table below shows which of these fields each program indexes, as well as the number of other predefined fields and user-defined fields that are indexed. The trade-off for such capabilities? Each additional index consumes more space and slows the process of adding and deleting records, because every index must be updated during these operations.

We sought to measure the time each program takes to find records under various circumstances. We searched a 2000-record database on indexed fields and non-indexed fields using Boolean searches ('last name = Smith AND city = New York,' for example) and keyword searches (like finding widgets anywhere in any field).

The results surprised us; it seems that searching means different things to different programs. For example, both the ACT! and Maximizer programs group the results of a search so that you can quickly see all the records that satisfy your search. These programs then repeat the search and go to the next matching record.

Because of these different search techniques, the scores on these timed tests could not be fairly compared in a conventional performance-test graph, and we decided to present some of them here in a more anecdotal fashion. The speed of searches in some programs depend on the record you are viewing when you start the search and the order in which the records are sorted. In a program that sorts records based on company, you'll find that looking up, say, Xerox Corporation will be faster if you are currently at the Valley Green Country Club record than if you are at the Acme Products record.

Of the contact managers here, only Commence was unable to search an indexed field in less than one second. ACT! was able to perform the search in less than half a second.

There was a much wider variation in the speeds for non-indexed searches. Commence, which had the slowest time for an indexed search, barreled its way through the non-indexed searches in just over three seconds. ACT! and Maximizer for Windows were able to complete these searches in less than 10 seconds. However, ACT! for Windows lumbered along, taking over three minutes to complete the task.

## Roll your own

As you become more familiar with your contact manager, you will most likely use its user-defined fields to customise the program to your needs. For example, you may create a field called Account Manager, which you would want indexed because you often use account information to define your searches. Disappointingly, few programs allow indexing of user-defined fields. The Maximizer product stands out favourably, indexing all of its user-defined fields (which it calls *categories*). Surprisingly, few programs index a contact's first name. And SmartOffice lets you search for a first name only in combination with a last name.

## All zipped up

We found that many more programs search on postcode than on city or state. Knowing a postcode can be quite useful when defining sales regions, because all postcodes starting with the same two or more numbers are likely to represent proximate areas. But since you're not likely to know hundreds of postcodes by heart, indexing postcode and not city or state seems counterproductive.

Most users would benefit from searches based on a combination of city, state and postcode. Let's say, for example, you're going to Melbourne on

business. You look up your contacts in Melbourne and notice that postcodes in that vicinity start with 30. You could then broaden the search by telling the program to find all contacts with postcodes starting with those two numbers.

Often, you'll need to look up contacts based on more than one criterion. Say your company wants to open a new store in Perth. You'll need a lawyer in the state to help you set up the business, so you'll want to enter 'state = Perth AND status = solicitor.' Or say you want to send a mailing out to all of your contacts who are suppliers or resellers. You might enter 'state = Perth AND status = supplier OR reseller.' The complexity of the search can grow and grow.

A few of the reviewed products stood out in this area. ACT! for Windows, although excruciatingly slow, has a very sophisticated function called SmartQuery, which walks the user through the search setup. Maximizer for Windows requires multiple steps. This is more time-consuming, but it might be somewhat easier for users not up on their Boolean syntax.

To perform an AND search in Maximizer for Windows, you first perform a search on the first criterion. Then you simply enter the next criterion and select Narrow List. For an OR search, choose Add to List.

## Data hunt

In our final test, we attempted to search across entire databases for every occurrence of a given word. This process lets you act on the feeling that says 'I know it's in there; I just can't remember where.' Both versions of ACT! let you search everywhere, through the history log, contact notes, and lists of future activities. None of the other programs offered this feature. A makeshift method is to enter a complex search by specifying the search word in every field in the database. In the end, however, you're likely to end up praying you never get into a situation where you really have to do this.

### INDEXING: QUICK SEARCH POWER

	ACT!	ACT! for Windows	Commence	Maximiser for Windows	SuperOffice
Indexed Fields:					
Company	●	●	●	●	●
First name	●	●	○	○	○
Last name	●	●	●	●	●
City	●	●	○	○	○
State	●	●	○	●	●
Post code	●	●	○	●	●
Phone number	○	○	○	●	○
Contact status/type	●	●	○	●	○
Additional predefined indexed fields	None	None	None	3	4
User-defined indexed fields	None	None	None	Unlimited	None

The first name can be used only as a filter in a last-name search



tion manager) than a contact manager, it offers the basic set of contact management tools found in all of the products reviewed here. Moreover, its Agents feature takes the automation of this process a step further. Comprising a set of user-defined conditions that trigger actions by the program, Agents — like many of Commence's features — takes some learning time. But the payoff is flexibility and powerful performance.

Commence's familiar Windows interface houses some unusual terminology. 'Categories' refers to the types of information you want to store and what fields are included in the data screens (Person, Company, To-Do, Appointment, and so on). You can modify what's there or delete and add your own fields. In order to add a new contact record, you activate the Person category, click on the Add Item icon, and fill in the blanks. While Commence ships with predefined fields in each category, users can customise the category — adding, deleting, and modifying fields and connections to other categories.

One of the more unusual — and sophisticated — aspects of Commence is its handling of task, meeting and phone-call data, as well as the way it connects this information among contacts. Each contact detail screen

## Tracker for Windows rivals ACT!

BY JEREMY TORR

Softcode's latest Windows version of Tracker has put the Victorian-based developer into the market squarely opposite Symantec's new acquisition, ACT! Like ACT! it uses the Windows interface to provide easy to see field and subject information, extensive macro capability and an iconised button bar as well as conventional nested menus. It also includes many hotkey commands for those who like keyboards better than mice.

Improvements have expanded the ability to input, search and modify up to 255 characters in any of 75 configurable fields, along with 10 attached notepads on each entry. Also included are full network capability including group scheduling, and a built in email hook for AT&T EasyLink, which offers some very attractive online charges to the package.

Faxing, word processing, time management, mailing and reporting are all available from within the package. The software is supplied with some well-produced manuals detailing both software operation and the best way to maximise PC investment using contact management software.

At a retail of \$699, with a \$199 upgrade for existing users, Tracker for Windows offers a workable, homegrown alternative to Symantec's ACT! with some special extras like the EasyLink feature not available in the opposition product.

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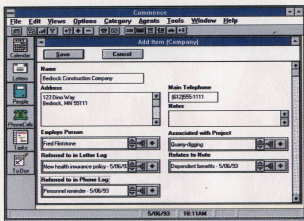
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# OKI

People to People Technology



Commence's data-entry screens allow easy access to connections among people, companies and projects

has several rectangular boxes with such labels as 'Is employed by company', 'Relates to note', 'Is referred to in letter log', and 'Attends appointment'. To establish a connection between a person and a company that already exists in the database, click the Connection Field button and point to the company name. If the company does not exist, click on the plus sign to the right of the box and fill in the blanks in the pop-up dialogue box.

Commence's detail in all categories — to-do lists, meetings, phone calls, and so on — is also decidedly top-notch. Commence allows both simple searches and those more complex Boolean searches, which it calls Filters.

## AT A GLANCE

### Commence

**Distributor:** GUI Computing  
**Telephone:** (03) 827 0144  
**Price:** \$599  
**Requires:** 2M RAM, 6M hard disk space, Microsoft Windows 3.0 or later.  
**In short:** Commence's non-traditional methods of organising contacts and setting up relationships may be hard to understand at first. But its core capabilities are first-rate. You can keep detailed records on people, companies and projects, and view them in a variety of ways. The program's level of customisation is greater than many of the products here, and the handy Agents feature is a tool you can use to automate your client relationships even further. Casual users, though, should think twice before considering Commence.

### Commence

#### SUITABILITY TO TASK

Contact database	<b>GOOD</b>
Scheduling	<b>EXCELLENT</b>
Correspondence	<b>FAIR</b>
Extensibility	<b>POOR</b>

Sorted data (or complete databases) can be viewed in four different formats: book, calendar (daily, weekly or monthly, which use colour codes for different types of appointments), Gantt chart, and report (the default view).

## No secret

The Agents feature provides capabilities that are unusual in a contact manager. Though it has many levels of complexity, Agents in essence lets you define a trigger that makes an action occur. Take an

automatic check of your weekly expense total, for example; if the total exceeds a certain amount, a message pops up. You can also set up Agents to launch DDE (Dynamic Data Exchange) messages to other applications. Commence defaults to

Microsoft Windows Write for letter writing, though it has DDE links to Lotus' Ami Pro and Word for Windows. Form-letter templates can be edited, and contact information can be used in a mail-merge.

## Commencing

There are 19 predefined and 200 user-defined reports to help you analyse relations with contacts in more depth.

While this version lacks networking abilities, Version 2.0 (which should be on the shelves by the time you read this) will offer workgroup capabilities. That upgrade will also offer fax connections, sophisticated digital telephone support, drag-and-drop scheduling and other calendar enhancements, database protection, and import scripts for ACT!, Polaris Software's PackRat, and Microsoft Windows Cardfile. Commence is not the most intuitive contact manager in this group. Setup and learning time can be significant. But you're regarded with a highly flexible, sophisticated contact manager that allows a great deal of customisation. For power users, or for those who just need power, it's an intelligent buy.

## Maximizer for Windows

By Gregg Keizer

With its reputation as a somewhat difficult-to-use program, Maximizer was never able

## AT A GLANCE

### Maximizer for Windows

**Distributor:** The System Works  
**Telephone:** (07) 229 1533  
**Price:** \$495  
**Requires:** DOS version: 512K RAM, 2M hard disk space, DOS 2.1 or later. Windows version: 2M RAM, 3M hard disk space, Microsoft Windows 3.0 or later.

**In short:** Maximizer, available in both Windows and (by order) in DOS versions, applies a different philosophy to contact management. Rather than work in a form-like view, Maximizer uses lists to connect an unlimited number of contacts with any company and pigeonholes people with user-definable categories. While the previous DOS version couldn't compete with high-powered programs such as ACT!, its Windows sibling is flexible, fast, and an extremely capable contact manager that can compete with anything on the market.



to compete effectively with ACT! in the DOS contact management market. Things have changed. Richmond Technologies & Software's Maximizer for Windows (\$495) gives ACT! a run for its money. It may be as quirky as its predecessor (Maximizer for DOS is now only available through special order from the Australian distributor), omitting several important contact management tasks (recording completed tasks and logging tasks, for instance), by Maximizer for Windows' flexibility, speed, stability, and low system-resource consumption mark it as a contact manager that simply cannot be ignored.

## The Richmond way

With Maximizer, Richmond took a different approach to contact management. Rather than depend on a one-contact-per-form view, both Maximizers link an unlimited number of contacts (people) and clients (companies) in a series of lists. And instead of depending on user-definable fields for extra information, Richmond utilises manipulative — and unlimited — categories (called *descriptions* in the DOS title) to associate records. The result is a package that works extraordinarily well in tracking groups of connected contacts, whether they work for the same company or simply share one or more of the definable categories.

Both versions start from the same place, but they don't finish together. Because the



Windows product hands you multiple frames — one for the client list, another for the contact list, and so on — you decide how to view the contact data. As you scroll through the list of clients, for instance, the contact window stays in sync.

Entering data is more complicated in the Windows version than the previous DOS version, as you're forced into minor mouse and keyboard gymnastics. To add a new client and a single associated contact, for instance, you're forced to work in two separate windows.

On the other hand, this package provides slick data import and export functions, with excellent field matching and mapping when you move contact information in and out of the program.

## Max contact

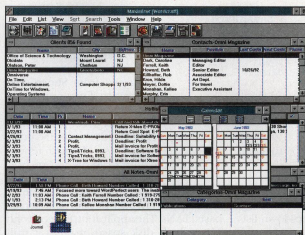
Both programs provide nearly everything you'll need to make phone calls, schedule follow-ups, and record and review your contact history. Scheduling in the Windows version is superior to scheduling in the DOS version, because the former includes recurring appointments, an alarm, and a prioritised to-do list. Phone calls are logged automatically in both versions, an unlimited number of notes can be attached to

any contact, and a history log is available. Several important scheduling tasks, however, are omitted from both programs, including recording of completed appointments and meetings, and logging finished tasks. Maximizer

for Windows searches large numbers of contacts quickly. Building Boolean queries based on one or more categories is simple: it's just a matter of selecting one or more categories from a list.

The combination of unlimited categories descriptions and fast searching lets you collate your contacts in an almost infinite variety, easily forming ad hoc subgroups. This combination even lets you store those subgroups for later recall. Outbound correspondence is well handled in both versions by a built-in internal word processor, though it also offers DDE (Dynamic Data Exchange) links to external word processors. On-the-fly mailmerge, where you're entering fields from a contact record as you compose a letter, is a snap with Maximizer for Windows.

Reporting is adequate, though compiling summary information about completed activities by contact is weak.



Maximizer for Windows lets you arrange the interface by placing and sizing its many windows

## Linked

Maximizer for Windows can be used over networks. The product, in fact, is network-aware as is and includes a slick data transfer tool to move contact information between databases. It is also a strong performer when it comes to synchronising data between portable and desktop machines.

Overall, the Windows version shines brighter than the older DOS version. Its low system-resource consumption — a mere five per cent — makes it a good choice when you're serious about multitasking, and its stability keeps data alive, even when the system goes down unexpectedly. You may have a hard time assimilating with the program (the list-based approach takes some getting used to), but, in the end, Maximizer for Windows is an extremely capable contact manager suitable for anyone who tracks more than a handful of people associated with any one organisation.

## SuperOffice

By Kathy Yakal

An attractive user interface and easy connectivity to outside applications are critical components of contact managers. SuperOffice, Version 2.5 (from \$530), excels in both of these areas, though it doesn't offer the depth of features provided by the other contact managers we reviewed in this price range.

The Windows-based SuperOffice offers easy links to other software. These are not DDE

(Dynamic Data Exchange) links: they simply allow you to launch other applications from the program. Icons are provided for word processing, spreadsheets, accounting, presentation graphics, email, desktop publishing and order entry.

The program's main working screens are attractive and uncluttered. You flip back and forth between the Customer screen (where contact data is entered) and the Diary screen (which shows your daily calendar and to-do list). Icons running along the side and

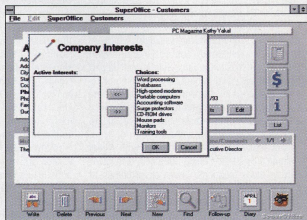
bottom give you access to features such as the Notes field, auto-dialling, and history screens.

You can import a data file into SuperOffice in ASCII format (or any delimited format); a nice field-mapping feature is included to ease this process. Unfortunately, you can't import in .DBF format, and you can't create more than one database.

To add a contact in SuperOffice, you type data into fields on the customer screen. While there is room on the form to accommodate up to 50 alternative contacts per company, there are very few predefined and user-defined fields for entering data that is contact-specific.

SuperOffice keeps an ongoing history of your interaction, logging phone calls, meetings, and other notes and tasks, and reminding you when it's time to follow up with a contact.

Besides letting you run the simple search routines you'd expect from this kind of software (find all the customers in Sydney, for example), as well the more complex Boolean searches, SuperOffice



SuperOffice lets you assign customers to user-defined interest categories



lets you categorise contacts by interests. Tag all of your contacts interested in word processing, for example, and you can quickly generate a mailing list when you have a new product ready.

## Office assist

You can easily schedule any kind of event. Click the New button at the bottom of the Diary screen, select the contact name and the type of event (outgoing call, meeting, task, and so on) from the drop-down lists in the pop-up dialogue box, and enter the pertinent details. Unfinished items roll forward until they are marked as done and then move into the history log.

All scheduled items appear in chronological order at the bottom of the Diary screen, and meetings are displayed on the daily calendar above the list. No alternative views of the calendar (weekly or monthly) are available, and tasks cannot be prioritised.

### SuperOffice

#### SUITABILITY TO TASK

Contact database	FAIR
Scheduling	FAIR
Correspondence	POOR
Extensibility	GOOD

SuperOffice provides easy links to outside applications such as word processors, fax software and email programs, but add-on modules must be purchased from SuperOffice Corporation if you want to use those links optionally.

Twenty-five predefined report options are included, though user-defined reports require a US\$199 add-on from the company (Conexus will order this in for you if needed). SuperOffice runs on peer-to-peer and server-based LANs. The application takes up only 1M of hard disk space, making it truly portable.

If you need highly detailed, customisable contact screens and integrated word processing and fax capabilities, SuperOffice may not be your best choice. But for basic, competent contact management with a good-looking, easy-to-navigate user interface, this package might be worth your consideration.



## AT A GLANCE

### SuperOffice Version 2.5

**Distributor:** Conexus  
**Telephone:** (02) 975 2799  
**Price:** \$530 for single user  
**Requires:** 2M RAM, 1M hard disk space, VGA monitor, Microsoft Windows 3.0 or later.

**In short:** SuperOffice, Version 2.5, is less competent than some of its competitors. Its import and export functions are limited, and its contact data screen and task-management abilities are inflexible. Still, it offers a clean, attractive design, which makes the program easy to understand and use. The interests feature, for example, lets you group contacts by commonalities, letting you go beyond standard searches by contact fields. Users who work in several applications during the day will appreciate the links to other programs.

# SalePro takes a different approach

The role of a salesperson in today's organisations covers a broad range of skills, from contact management through to territory and market segmentation. Price Waterhouse's SalePro is a Lotus Notes application that was developed to assist both sales staff in their jobs, and management in controlling the sales function. The program automates the Miller Heiman Strategic Selling methodology as well as providing account management facilities. The Miller Heiman methodology has been adopted by many of the world's top corporations to provide a structured approach to professional selling.

SalePro performs a different role to the traditional sales support software packages, which are tactically orientated, contact management programs. In most situations, SalePro will be part of a total system that caters for planning of individual phone calls through to providing ongoing support to a customer and forecasting. Because all organisations do this differently, no two SalePro implementations are the same.

For those who are not familiar with Miller Heiman's Strategic Selling approach, it involves regular team meetings where opportunities or Singles Sales Objectives (SSOs) are 'Bluesheeted'. The Bluesheet focuses the attention of team members on problem areas and develops action plans aimed at keeping the opportunity on a critical path to success. It also provides

an organisation with the ability to know when to let an opportunity go.

SalePro helps overcome the difficulties and inefficiencies of frequent meetings and the constant need to access and update Bluesheet information. While the use of SalePro does not remove the need for conventional, face-to-face meetings, it reduces the number of meetings required and it ensures that all team members are adequately informed prior to the meetings. The placing of all critical SSO data in the Lotus Notes environment allows the team members to have access to all information, irrespective of location or time.

The conventional account management model provides for an 'account manager' to own the account relationship. While this model results in a controlled vendor/customer relationship, it also brings on a bottleneck, as shown in Figure 1. This bottleneck means that the vendor cannot provide the best service to a customer. The model shown in Figure 2 is one of the alternative models possible with the use of SalePro. This model allows one to one, one-to-many or many-to-many communications between the vendor and the customer. These communications facilitate the best possible customer service, yet are still able to be managed under a total account relationship.

For further information, contact Tim Royle at Price Waterhouse on (02) 817 3707, fax (02) 817 3126 or at Compuserve address 100250.500.

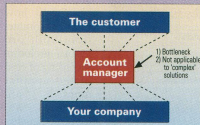


Fig 1: Conventional account management model

*Explanation: the above diagram shows a typical conventional account manager to customer relationship. The account manager is responsible for all customer requests, from the provision of major items to addressing small, low-ticket requests. This relationship creates a bottleneck in communications, and while it may have sufficed, or may still suffice in environments that are 'simplex product' orientated, it is not a relevant approach for those organisations that are marketing 'complex products, solutions or services'. For these organisations, a better controlled approach that embraces the need for 'many to many' communications is needed.*

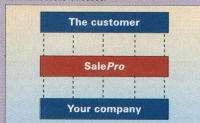


Fig 2: SalePro account management model

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## Summary of features: Contact management software

● = Yes ○ = No

Products listed in alphabetical order

	ACT	ACT! for Windows	Commence	Maximizer for Windows	SuperOffice
Price	\$599	\$599	\$599	\$495	\$530
Site licences available	●	○	●	●	●
Network versions available	●	○	○	●	●

## Standard Screens

Maximum number of databases	Unlimited	Unlimited	50	Unlimited	1
Maximum number of records per database	Unlimited	Unlimited	8000	Unlimited	Unlimited
Fields included:					
Email carrier	●	●	○	○	○
Fax number	●	●	●	○	●
Customer ID number	●	●	○	●	●
Referred by	●	●	○	○	○
Customisable data entry lists	●	●	●	●	●
Maximum number of user-defined fields	29	70	49	None	3
Maximum number of phone numbers per contact	4	4	3	4	1
Maximum number of alternative contacts per record	2	2	N/A	Unlimited	50

## Contact management

Searches multiple fields	●	●	●	●	●
Boolean searches	●	●	●	●	●
Saves queries	●	●	●	○	○
User-defined contact groups	●	●	●	●	●
Free-form text fields	●	●	●	●	●
Maximum number of characters	Unlimited	Unlimited	30,000	9000	40
User can cut and paste to and from fields	●	●	●	●	●

## Data import/export

Imports/exports ASCII files (delimited)	●●	●●	●●	●●	●○
Imports/exports ASCII files (fixed-length)	●●	●●	●●	●●	○○
Default database file format	Proprietary	DBF	Proprietary	Btrieve	C-Tree
Can import from other contact managers	●	●	●	○	○
Can reconcile duplicate entries	●	●	●	●	●

## Call automation

Automatic redial	●	●	○	○	○
Global dialing prefix adjustment	●	●	○	●	●
Maximum prefix length (characters)	70	70	30	39	100
Maximum suffix length (characters)	60	60	4	39	100
Local area-code adjustment	●	●	●	○	●

## History

Phone-call time and date stamp	●	●	●	●	(date stamp only)
Last action taken recorded:					
For all fields	●	○	○	○	○
In free-form text file	○	○	○	●	●

NA - Not applicable. The product does not have this feature.



## Summary of features: Contact management software (continued)

	ACT!	ACT! for Windows	Commence	Maximizer for Windows	SuperOffice
<b>History (continued)</b>					
In log file	●	●	●	●	●
Automatic follow-up reminder	●	●	●	●	●
Can purge historical records by date range	●	●	●	●	○
<b>Scheduling</b>					
Calendar	●	●	●	●	●
Time scale	●	●	●	●	●
Adjustable	●	●	●	●	○
Event alarm	●	●	●	●	○
Buzzes within other applications	●	●	●	●	N/A
Weekly view	●	●	●	●	○
Monthly view	○	●	●	●	○
Yearly view	○	○	●	○	○
To-do list	●	●	●	●	●
User can assign priority levels to tasks	○	●	●	●	○
User can attach notes to tasks	●	●	●	●	●
Carries undone tasks forward	○	●	●	●	●
<b>Word processing</b>					
Links to external word processor	●	●	●	●	●
Integrated word processor	●	●	●	●	○
Spell-checker	●	●	●	●	N/A
Integrated mailmerge/letter generator	●	●	●	●	●
Imports boilerplate text	●	●	●	●	●
Prints envelopes	●	●	○	●	●
Prints labels	●	●	●	●	●
Links to external fax software	○	●	○	●	●
Internal fax capability	●	○	○	○	○
Can fax boilerplate text	●	N/A	N/A	N/A	N/A
Can delay transmission	●	N/A	N/A	N/A	N/A
Can queue for multiple faxing	●	N/A	N/A	N/A	N/A
<b>Reports and utilities</b>					
Number of predefined reports	9	9	19	20	25
Maximum number of user-defined reports	Unlimited	Unlimited	200	Unlimited	N/A
Can produce column math in reports	●	●	●	○	●
Expense tracker	●	○	●	●	○
Macro facility	●	●	●	●	●
Backup/restore facility	●	●	●	●	●
Calculator	●	○	●	○	○
<b>Security/help</b>					
Password security	●	●	○	●	●
Context-sensitive help	●	●	●	●	N/A
<b>Portability</b>					
Links to handheld computers	●	●	○	○	○
Hard disk space required	2M	2.5M	6M	2.5M	1M
RAM requirements	640K	3M	2M	2M	2M
Can function as TSR	○	○	○	○	○

N/A — Not applicable: The product does not have this feature

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*FINDEXEC locates a file — and its DLLs — that will execute in response to your command under DOS, OS/2 or Windows.*

BY DOUGLAS BOLING

# FINDEXEC locates the program that will run

**H**ave you ever entered a program name at the command prompt only to find yourself running a different application than you expected? The same DOS PATH variable that lets you run programs without specifying their directories can necessitate a tedious search if you have to track down a same-named application located somewhere earlier on the PATH than the program you intended to execute.

FINDEXEC, this issue's free utility, does the searching for you. It prints out the location of a program without executing it. The utility is unusual in that it is operating-system neutral: you can run it from a DOS or OS/2 command line or from a Windows DOS box and it will adjust its search method for the operating system in use. (The one restriction is that since FINDEXEC is a character-mode application, you must be in character mode rather than in graphics mode.) Because Windows and OS/2 programs usually require dynamic link libraries (DLLs), FINDEXEC also reports the locations of any libraries needed to run those programs.

Getting a copy of FINDEXEC is almost as easy as running it. Simply contact Magdisk, as explained in the box on page 208. Compiling the FINDEXEC source is a little more involved than is usual for the utilities featured in this column, so I'll discuss this issue toward the end of the article.

## Using FINDEXEC

Whether you run FINDEXEC under DOS, OS/2 1.x, OS/2 2.x, or from a Windows DOS box, its syntax is the same:

```
FINDEXEC [/W] [/V] [/Ln] [/?]
```

### program\_name

For example, when I enter

### FINDEXEC COMMAND

at my DOS prompt FINDEXEC returns the line

```
DOS program: C:\DOS50\COMMAND.COM
```

FINDEXEC generally defaults to the search method used by the operating system in use. I'll discuss these in some detail below. In the case of Windows, the FINDEXEC default uses the DOS search procedure, since many times you may want a conventional DOS check from a Windows DOS box. By using the /W command line switch, however, you can tell FINDEXEC to use the specific Windows search method instead. In that case, FINDEXEC depends on the **windir=** environment variable to locate the Windows directory. Since this environment variable is present only in a Windows DOS box, the /W switch should not be used anywhere else. If the /W switch is used when Windows is not running, FINDEXEC displays an error message.

A FINDEXEC search under Windows or OS/2 does not end with the finding of a designated Windows or OS/2 program. Rather, FINDEXEC goes on to examine the .EXE file to determine which DLLs are required to run the program properly. FINDEXEC then searches for and reports the locations of these additional necessary files.

Again using my machine to illustrate, the command

```
FINDEXEC klondike
```

when executed from an OS/2 window, reports the following:

```
OS/2 2.x Program:
C:\OS2\APPS\KLONDIKE.EXE
Loads:
OS/2 DLL: DOSCALLS
OS/2 2.xDLL: C:\OS2\DLL\PMGPI.DLL
OS/2 2.xDLL: C:\OS2\DLL\PMWIN.DLL
OS/2 2.xDLL: C:\OS2\DLL\FMSHAPI.DLL
OS/2 2.xDLL: C:\OS2\DLL\HELPMGR.DLL
```

Notice in the above list that KLONDIKE must load a DLL called DOSCALLS, but that FINDEXEC did not report its path. The reason is that there is actually no such file, so there is no path to it. When OS/2 starts, it loads its main operating system DLL by reading from one of a set of DLLs. Once in memory, the resulting DLL is simply called DOSCALLS, and FINDEXEC does all that it can by indicating that the program needs this unusual DLL.

A similar situation arises with Windows programs. Once Windows is loaded, KERNEL.DLL and DISPLAY.DLL are in memory, but there are no actual files named KERNEL or DISPLAY for FINDEXEC to locate. So again, the utility simply prints out a line indicating that the program requires these DLLs.

Fortunately, it doesn't matter that FINDEXEC can't print a path to these particular DLLs. Since Windows can't run without KERNEL and DISPLAY, and OS/2 requires DOSCALLS, if Windows or OS/2 can run, the requisite DLLs are available. (Windows can't run without other DLLs such as USER and GDI. Remember, though, that the problem isn't that KERNEL and DISPLAY are required files, the



## How to obtain a copy of FINDEXEC

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Acc No: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 4 Digit No: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Signature: _____ Expiry date: ____ / ____	

problem is that there is no file called KERNEL.DLL or DISPLAY.DLL.)

Dynamic link libraries under Windows or OS/2 may require DLLs of their own in order to run. Thus, since there may be a DLL that cannot load because one of its necessary DLLs is missing, FINDEXEC can also search for every DLL required by every DLL! The /Ln and /V switches control how much information FINDEXEC prints for each of the required DLLs.

The /Ln switch tells FINDEXEC to descend to level n before ending its search. Using the switch /L3 will cause FINDEXEC to display all the DLLs required by the executable file, its required DLLs, their required DLLs, and their required DLLs!

For example, on my system, entering the following line

```
FINDEXEC /L3 /w notepad
```

in a Windows DOS box returns the listing shown in Figure 1. In this rather extensive list you'll notice that many of the DLLs are repeated. This simply means that some of the DLLs NOTEPAD loads depend on the same lower-level DLLs.

The /V (verbose) switch goes even fur-

ther by telling FINDEXEC to continue searching until it has listed every file required by every DLL. Especially under OS/2, using the /V switch can result in hundreds of lines of library listings. In most cases, checking one or two levels is enough, but if you want the complete rundown for all libraries, the /V switch will provide it.

FINDEXEC's final switch parameter, /?, brings up a help screen that explains the program's full syntax.

### Finding a program

As indicated earlier, depending on the operating system in use, FINDEXEC employs the same search methods used by DOS, Windows or OS/2 to find an executable file. Since these search methods differ somewhat, however, it may be useful to discuss them in detail.

The search for DOS executable files is actually performed by COMMAND.COM. If the user enters a path along with the desired program name, COMMAND.COM looks no further than the specified directory for the file. If no extension is specified, COMMAND.COM looks first for a .COM file, then for an .EXE file, and

finally for a .BAT file that matches the filename. Under DOS versions earlier than 4.0, even a user-specified file extension is ignored and the .COM-.EXE-.BAT search order is imposed. When a matching file is found, COMMAND.COM uses DOS's Exec function (Int 21 function 4Bh) to execute the file.

If the user does not enter a path along with the program name, COMMAND.COM starts by looking for the file in the current directory. Here, again, if the user does not specify an extension (or even if he/she does, under DOS versions prior to 4.0), DOS follows the .COM-.EXE-.BAT order in looking for the file. If no matching file is found, COMMAND.COM then searches for it successively in each of the directories listed in the PATH environment variable. The .COM-.EXE-.BAT sequence is followed within each directory, but a batch file with a .BAT extension will be executed instead of a program with a .COM extension if the .BAT file is in a directory listed earlier in the PATH.

The DOS APPEND program can modify the program search order. If APPEND is loaded with the /X-ON switch specified, COMMAND.COM looks in the APPENDED directories before it turns its attention to any path directories. Indeed, if both the /PATH-ON and /X-ON switches are set on APPEND, COMMAND.COM will load a program from the APPENDED directories even if the user specifies a path along with the program name. Thus, the effect of APPEND is to make COMMAND.COM (and any other DOS program) think that all the files in the APPENDED directories are located in the current directory. Since the current directory is checked before PATH directories, files in the APPENDED directories are executed before programs in the path.

The Windows search method is more complex. It is used by Windows when a program is launched from the File | Run menu item in the Program Manager or when a path is not included for an icon in the Program Manager window. Actually, the Program Manager doesn't perform the search for the program; Windows does. Windows uses its search method for any program (including the Program Manager) that uses WinExec; the Windows API function, to launch a program.

Thus, there is a fundamental difference between DOS and Windows file searches. In DOS, it is COMMAND.COM that determines the order of the search. In Windows, it is the WinExec API call that determines the search order. Any program that uses WinExec, such as my own WinCmd interpreter (which appeared in the APC June Utilities column), automatically ends up using the Windows search method. The equivalent DOS API—that is, Exec (Int 21

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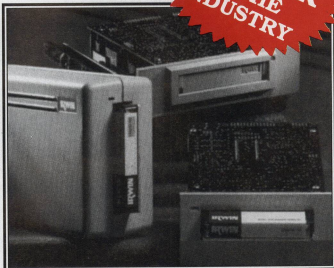
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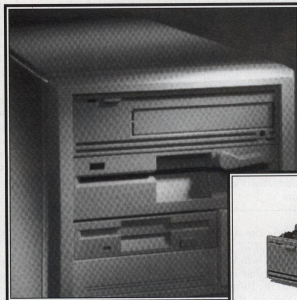
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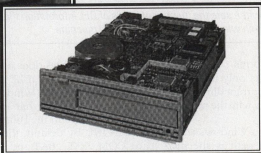


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## Sample FINDEXEC output

```

Windows Program: C:\WINDOWS\NOTEPAD.EXE
Loads:
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\USER.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: C:\WINDOWS\SYSTEM\SYSTEM.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\KEYBOARD.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\MOUSE.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\SYSTEM.DRV
  Windows DLL: DISPLAY
  Windows DLL: C:\WINDOWS\SYSTEM\SOUND.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\COM.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\SYSTEM.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\KEYBOARD.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\COMMDLG.DLL
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\USER.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: C:\WINDOWS\SYSTEM\SYSTEM.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\KEYBOARD.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\MOUSE.DRV
  Windows DLL: DISPLAY
  Windows DLL: C:\WINDOWS\SYSTEM\SOUND.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\COM.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\KEYBOARD.DRV
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\SHELL.DLL
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\USER.EXE
  Windows DLL: KERNEL
  Windows DLL: C:\WINDOWS\SYSTEM\GDI.EXE
  Windows DLL: C:\WINDOWS\SYSTEM\SYSTEM.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\KEYBOARD.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\MOUSE.DRV
  Windows DLL: DISPLAY
  Windows DLL: C:\WINDOWS\SYSTEM\SOUND.DRV
  Windows DLL: C:\WINDOWS\SYSTEM\COM

```

**Fig 1:** The FINDEXEC/Ln switch sets the number of levels of DLL information that are reported. To get this output, the switch was set to /L3 on the author's machine

Function 4Bh) — performs no searches. The Exec function works only if the program specified is in the current directory or if a path is specified along with the program name.

As with a DOS search, a Windows search depends on whether a path is specified with the filename. If so, then the search for the file is restricted to the directory specified. If a filename is entered by itself, Windows starts its search with the working directory, just as in DOS. DOS users know the *working* directory as the *current* directory.

If the program name sent to WinExec includes an extension, Windows looks only for a file that matches the name and extension. If an extension is not specified,

however, Windows does not restrict itself to the familiar .COM, .EXE and .BAT DOS extensions. Instead, Windows looks for files with extensions that are listed in the Programs= item in the (Windows) section of WIN.INI. By default, these extensions are .COM, .EXE, .BAT and .PIF, but other extensions can be added. For example, an .SCR extension is often added to the Programs= list so that Windows will look for screen savers. Windows uses the extensions in the order they are listed in Programs=. The default order looks like the DOS extension order with the .PIF extension added. In Windows, PIF (program information file) files are used to customise a DOS program's execution.

After looking for the file in the current

directory, Windows turns to the Windows directory. The Windows directory is where files such as WIN.COM, WIN.INI, and SYSTEM.INI are stored. Next, Windows looks in its system directory. This is the directory that holds such files as GDI.EXE and USER.EXE, along with the driver files that Windows uses.

If the file has still not been found, Windows looks next in the directory that holds the program calling WinExec. This directory may be different from the current or working directory. For example, if the calling program is launched from C:\DATA, but the Windows program itself is located in the C:\PROGRAMS directory, the *current* directory is C:\DATA, but the directory containing the executable file for the current task is C:\PROGRAMS. After checking the calling program's directory, Windows looks successively in each of the directories that are listed in the PATH. If the program is not found there, Windows examines any network directories that have been mapped.

When a Windows program requires a DLL, Windows checks to see whether another program has already loaded the same DLL. If so, Windows simply directs any calls to the DLL to the already-loaded copy. If the DLL is not in memory, Windows looks for it in the same directories that were scanned in the original program search. The only difference is that in this search Windows looks only for files with a .DLL extension. (Windows driver files with a .DRV extension are also DLLs, but they will already have been loaded at the time Windows was started.)

OS/2's method for searching for programs is closer to that of DOS than to that of Windows. The search is performed by CMD.EXE, which is OS/2's version of DOS's COMMAND.COM. If no path is specified with the program name, CMD.EXE looks in the current directory, then in each one of the directories listed on the PATH. CMD.EXE looks for the files with the extensions .COM, .EXE, .CMD and .BAT, in that order. (CMD files are OS/2's equivalent of DOS batch files).

As with DOS 4.0 and later, and as with Windows, the user can restrict the search by specifying the program's extension. Thus, if the user asks for PROG.EXE, CMD.EXE will ignore a program called PROG.COM even if the latter is in the same directory. OS/2 is intelligent enough to launch a Presentation Manager or DOS application from the OS/2 command line if the program found is a PM or DOS application. By contrast, attempting to execute a Windows program from a Windows DOS box results in the silly message, 'This program requires Microsoft Windows'.

Like Windows programs, OS/2 pro-



## FINDEXEC.C (partial listing)

## Partial listing

```
// GetEXEType - Loads a file and returns its operating system.
//-----
INT GetEXEType (char *szName, INT *pStatusHint, LONG *pPPtr) {
    BYTE lpbData;
    USHORT usSel, usBytesRead;
    INT sTargetOS;
    HFILE hFile;

    if (DosAllocSeg (BUFFSIZE, ausSel, 0))
        return ERR_OUTOFMEM;
    lpbData = MAKEP (usSel, 0);
    hFile = FileOpen (szName);
    if (hFile == -1) {
        DosFreeSeg (usSel);
        return ERR_NOOPENFILES;
    }
    DosRead (hFile, lpbData, BUFFSIZE, &usBytesRead);
    if (usBytesRead < <= 0) {
        FileClose (hFile);
        DosFreeSeg (usSel);
        return 0;
    }
    //Check for the old EXE header signature "MZ"
    if (* (USHORT) lpbData != <= 0x544d) {
        FileClose (hFile);
        DosFreeSeg (usSel);
        return 0;
    }
    //Check for New EXE header
    if (* (PSHORT) (lpbData+<= 0x18) < <= 0x40) {
        FileClose (hFile);
        DosFreeSeg (usSel);
        return 0;
    }
    //Read New EXE header
    *pPPtr = (LONG) * (PLONG) (lpbData+<= 0x3c);
    DosChgFilePtr (hFile, (LONG) *pPPtr, 0, pPPtr);
    DosRead (hFile, lpbData, BUFFSIZE, &usBytesRead);
    FileClose (hFile);
    switch (* (PSHORT) lpbData) {
        case <= 0x544E: //Check for NewEXE (NE)
```

```
if (* (lpbData+<= 0x3d) < 2)
    sTargetOS = 1; //Windows
else if (* (lpbData+<= 0x3d) < 1)
    sTargetOS = 2; //OS/2 1.x

if (* (PSHORT) (lpbData+<= 0x2c) < <= 0x0000)
    sTargetOS = <= 0x100; //Library

if (pStatusHint != 0)
    *pStatusHint = * (PSHORT) (lpbData+<= 0x18);
if (pPPtr != 0)
    *pPPtr = (LONG) * (PLONG) (lpbData+<= 0x28);
break;

case <= 0x544C: //Check for LinearEXE (LE)
    sTargetOS = 3; //Win 3.x Rdb mode
    if (* (PLONG) (lpbData+<= 0x10) < <= 0x0000)
        sTargetOS = <= 0x100; //Library

    if (pStatusHint != 0)
        *pStatusHint = (INT) * (PLONG) (lpbData+<= 0x74);
    if (pPPtr != 0)
        *pPPtr = (LONG) * (PLONG) (lpbData+<= 0x78);
    break;

case <= 0x544D: //Check for LinearEXE (LX)
    sTargetOS = 4; //OS/2 2.x
    if (* (PLONG) (lpbData+<= 0x10) < <= 0x0000)
        sTargetOS = <= 0x100; //Library

    if (pStatusHint != 0)
        *pStatusHint = (INT) * (PLONG) (lpbData+<= 0x74);
    if (pPPtr != 0)
        *pPPtr = (LONG) * (PLONG) (lpbData+<= 0x78);
    break;

case <= 0x5450: //Check for LinearEXE (PE)
    sTargetOS = 5; //Win/NT
    if (pStatusHint != 0)
        *pStatusHint = 0;
    break;
    }
    DosFreeSeg (usSel);
    return sTargetOS;
}
```

Fig 2: The GetEXEType routine in FINDEXEC is used to determine the target operating system of an executable

grams frequently require DLLs in order to run. When trying to locate a DLL, OS/2 looks first in the directories specified in the LIBPATH parameter of CONFIG.SYS. If the DLL is not found in one of the LIBPATH directories, the directory containing the program is searched. Unlike the program search, the search for DLLs is performed by the OS/2 system, not by CMD.EXE. That's because DLLs are used by all OS/2 programs, not just by those launched by CMD.EXE.

## FINDEXEC searches

Simply put, FINDEXEC itself uses the same rules to hunt for programs as do DOS, Windows and OS/2. For DOS and OS/2, FINDEXEC looks in the current directory, then checks each directory listed in the PATH statement. The Windows search is a bit more complex, since the Windows and Windows system directories must be checked. FINDEXEC performs all these searches by brute force, using the DosFind-

First API function to locate the first file with a proper extension.

FINDEXEC's real work comes after an OS/2 or Windows executable file is found during a Windows or OS/2 search. In these cases, FINDEXEC must determine whether the program requires any DLLs and, if so, it must then locate those DLLs. And to know what DLLs a program needs, FINDEXEC must know a little about the format of the executable file.

The structure of Windows .EXE and OS/2 1.x .EXE files are quite similar; both use the New Executable (NE) .EXE format. NE format programs are actually two programs bundled into one. The file begins with a standard (old) DOS .EXE header and a small DOS stub program. When run under DOS, the DOS Exec function sees the DOS .EXE header and loads the small DOS stub. Normally, the stub program simply prints out a message, such as 'This program requires OS/2', or 'This program requires Microsoft Windows'. However, a pointer in the old .EXE header contains the offset in

the file of the real .EXE header for the program. Both OS/2 and Windows look for this new header, which they use in loading the program.

The NE header is much more complex than the old, standard DOS header. The NE header begins with a signature word—the ASCII characters NE—that serves to identify it. The header itself contains pointers and offsets to various tables for resources, entry points into the program, and—what FINDEXEC is interested in—the list of a program's required DLLs. The NE header is documented both in the *Windows Software Development Kit* and in Appendix D of Ray Duncan's *Advanced OS/2 Programming* (Microsoft Press, 1991).

Enhanced-mode Windows applications, OS/2 2.x applications, and Windows/NT applications use different and mutually incompatible .EXE file formats. All that these formats have in common are the real-mode DOS stub program idea and a format-identifying signature in the first two or four bytes at the start of their new .EXE headers.

## File, memory, and operating system functions

1 of 2

Function	Description
DosAllocHuge	Allocates huge memory block greater than 64K
DosAllocSeg	Allocates memory block
DosBeep	Generates tone
DosBufReset	Flushes file buffers, updates directory
DosCaseMap	Translates ASCII string in place
DosChDir	Selects current directory
DosChgFilePtr	Sets file pointer position
DosCLIAccess	Notifies intent to use on CLI and STI
DosClose	Closes file, pipe or device
DosCreateCSAlias	Obtains executable alias for data segment
DosDelete	Deletes file
DosDevConfig	Returns system hardware configuration
DosDevIOCtl	Device-specific commands and information
DosDupHandle	Duplicates or redirects handle
DosErrClass	Returns information about error code
DosError	Disables or enables system critical error handler
DosExecPgm	Creates child process
DosExit	Terminates thread or process
DosFileLocks	Locks or unlocks file region
DosFindClose	Releases directory search handle
DosFindFirst	Searches for first matching file
DosFindNext	Searches for additional matching files
DosFreeSeg	Releases selector
DosGetCollate	Returns collating sequence table
DosGetCp	Returns current code page identifier
DosGetCtryInfo	Returns internationalisation information
DosGetDateTime	Returns current time, date, and day of week
DosGetDBCSEv	Returns table of double-byte character-set codes
DosGetEnv	Returns selector for process' environment
DosGetHugeShift	Returns increment value for huge memory block selectors
DosGetMachineMode	Returns flag indicating real or protected mode
DosGetMessage	Retrieves message from disk file
DosGetVersion	Returns DOS or OS/2 version number
DosHoldSignal	Suspends signal processing for current process
DosInsMessage	Inserts variable text into body of message
DosMkDir	Creates directory
DosMove	Renames and/or moves file
DosNewSize	Changes size of file
DosOpen	Opens, replaces or creates file, or opens device
DosPortAccess	Notifies intent to use range of I/O ports
DosPutMessage	Sends message to file, pipe or device
DosQCurDir	Returns current directory
DosQCurDiror	Returns current disk drive
DosQFHState	Returns file handle sharing and access characteristics
DosQFileInfo	Returns file size, attributes, and date and time stamps
DosQFileMode	Returns file attributes
DosQFSInfo	Returns file system information or volume label
DosQVerify	Returns state of read-after-write flag
DosRead	Reads data from file, pipe or device
DosReallocHuge	Resizes huge memory block
DosReallocSeg	Resizes normal memory block
DosRmdir	Deletes directory
DosOpen	Opens, replaces or creates file, or opens device
DosPortAccess	Notifies intent to use range of I/O ports
DosPutMessage	Sends message to file, pipe or device

Fig 3: Here is a list of the OS/2 Family Application functions

The alphabet soup of .EXE formats includes the LX format for OS/2 2.x programs, the LE format for Windows VxD drivers, and the PE format for Windows/NT programs.

For each supported .EXE type, FIND-EXEC determines the type of .EXE and then reads in the list of required DLLs. The code for determining the .EXE type is shown in Figure 2. Briefly summarised, the GetEXEType routine opens the file and reads in the DOS .EXE header. If the value at offset 18 hex is greater than 40 hex, the file contains one of the new header types. A pointer to the new header is located at offset 3C hex in the old header. GetEXEType reads in the header and then uses the signature bytes at the start of the new header to determine the .EXE type.

## A FAPI application

How can one program be both a DOS application and an OS/2 application at the same time? If you browse through the FIND-EXEC source code, you'll find that there are a number of calls to the OS/2 API but none to DOS. In fact, FINDEXEC is an OS/2 1.x program that uses a subset of the OS/2 1.x character-mode API. So, how can FIND-EXEC run under DOS when it is an OS/2 program?

The answer is that FINDEXEC is compiled, linked and bound into what is called a *Family Application*. A Family Application uses a limited part of the OS/2 API that can be translated into DOS calls by means of a special binding layer when the program is run under DOS.

With all the conflicts over PC operating systems these days, I find it amazing that the character-mode OS/2 1.x API is supported by all the new operating systems. You'd expect that IBM's OS/2 2.x would be backward-compatible with OS/2 1.x, but even Microsoft's Windows/NT supports OS/2 1.x character-mode applications. Add the ability of a Family Application to run under DOS, and you end up with an application that will execute under every mainstream operating system running on the PC today!

The set of Family API (FAPI) functions is listed in Figure 3. To an OS/2 programmer the list will look rather sparse, but a DOS programmer will find a veritable feast of powerful functions. The only glaring omission is a set of mouse functions. To handle a mouse, FAPI programs must use MOUSE.COM's Int 33 calls when run under DOS and OS/2 MouXXX calls when run under OS/2 or Windows NT.

Family Applications must be written as OS/2 apps, with none of the straight-to-the-hardware practices normally found in DOS programs. Further, since a FAPI program

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## File, memory and operating system functions

2 of 2

Function	Description
DosQCurDir	Returns current directory
DosQCurDisk	Returns current disk drive
DosQFHState	Returns file handle sharing and access characteristics
DosQFileInfo	Returns file size, attributes, and date and time stamps
DosQFileMode	Returns file attributes
DosQFSInfo	Returns file system information or volume label
DosQVerify	Returns state of read-after-write flag
DosRead	Reads data from file, pipe or device
DosReallocHuge	Resizes huge memory block
DosReallocSeg	Resizes normal memory block
DosRmdir	Deletes directory
DosSelectDisk	Selects current disk drive
DosSetDateTime	Sets current date and time
DosSetFHState	Sets file handle characteristics
DosSetFileInfo	Sets file time and date stamps
DosSetFileMode	Sets file attributes
DosSetFSInfo	Adds or changes volume label
DosSetSigHandler	Registers signal handler
DosSetVec	Registers handler for hardware exception
DosSetVerify	Sets system read-after-write flag
DosSleep	Suspends requesting thread for specified interval
DosSubAlloc	Allocates memory from local heap
DosSubFree	Releases memory in local heap
DosSubSet	Initialises local heap
DosWrite	Writes to file, pipe or device

## Keyboard functions

KbdCharIn	Returns keyboard character and scan code
KbdFlushBuffer	Discards waiting keyboard characters
KbdGetStatus	Returns logical keyboard status
KbdPeek	Returns character-waiting status
KbdSetStatus	Sets logical keyboard characteristics
KbdStringIn	Reads buffered line from keyboard

## Video functions

VioGetBuf	Returns address of logical video buffer
VioGetConfig	Returns hardware characteristics of video adaptor
VioGetCurPos	Returns cursor position
VioGetCurType	Returns cursor shape, size and attribute
VioGetMode	Returns characteristics of current display mode
VioGetPhysBuf	Returns selector for physical video display buffer
VioReadCellStr	Reads string of character-attribute pairs
VioReadCharStr	Retrieves character string from display buffer
VioScrLock	Locks physical display for I/O
VioScrollDn	Scrolls display down
VioScrollLf	Scrolls display left
VioScrollRt	Scrolls display right
VioScrollUp	Scrolls display up
VioScrollUnLock	Releases lock on physical
VioSetCurPos	Sets cursor position
VioSetCurType	Sets cursor shape, size and attribute
VioSetMode	Selects display mode
VioShowBuf	Updates physical display from logical display buffer
VioWrtCellStr	Writes character-attribute pairs to display
VioWrtCharStr	Writes character string to display
VioWrtCharStrAtt	Writes character string with specified attribute to display
VioWrtNAttr	Changes attributes of one or more characters on display
VioWrtNCell	Writes one or more character-attribute pairs
VioWrtNChar	Writes one or more characters
VioWrtTTY	Writes character string to display in teletype mode

executes in protected mode under OS/2, strict segment discipline must be maintained. That means no accessing of unallocated memory locations and no segment arithmetic beyond what is allowed when dealing with huge pointers. Unfortunately, when executing under DOS, FAPI applications are subject to the DOS real-mode limit of 640K of total RAM.

Though FAPI applications are supported by the current operating systems, actually creating one is an exercise in technological archeology. The problem is that neither OS/2 1.x nor the FAPI concept ever really caught on. To compile a FAPI application, you need both a compiler that supports OS/2 1.x and the BIND.EXE program that was bundled with the OS/2 1.x Software Development Kit. Microsoft's C 5.1 and 6.0 Compilers represent another source for the OS/2 1.x libraries and for BIND. Unfortunately, Microsoft removed OS/2 support and BIND.EXE from its C 7.0 product, so if you upgraded and deleted all the old compiler files, you're out of luck. IBM is not much help either: the OS/2 2.0 Software Development Kit can't be used to create OS/2 1.x applications. And although IBM has kept the OS/2 1.x SDK in its product list, it may be a chore actually getting hold of such an old product. My advice is to hunt through your old compiler files or give your compiler vendor a call.

FAPI applications are compiled as OS/2 character-mode applications. The compiler and linker must support OS/2 1.x: The OS/2 resource compiler is also necessary to set the appropriate flags in the EXE header. Finally, the BIND program is necessary to turn the OS/2 application into a FAPI application.

BIND.EXE is the key to the FAPI concept. When BIND is run against an OS/2 1.x character-mode application, it replaces the standard DOS stub program with a set of libraries that translate the OS/2 API calls into DOS calls. For example, if a FAPI program called the OS/2 function DosFindFirst, BIND would hook in a routine that would translate the DosFindFirst call into DOS's FindFirst call (Int 21h Function 4Eh). On the other hand, when the FAPI program is executed in protected mode, the ODS API translation program that BIND hooked in is skipped in favour of the native protected-mode code.

Once the real-mode routines have been hooked into an OS/2 application, that application will run under DOS and OS/2 without requiring any special files. If fact, without looking at the structure of the .EXE file itself, you won't be able to tell a FAPI application from a DOS or OS/2 character-mode application.

If the FAPI concept is so attractive, why isn't every DOS application a FAPI application? The answer lies in the commercial fate

## QUICK REFERENCE GUIDE

FINDEXEC.EXE  
command

Douglas Boling  
September, 1993 (Utilities)

**Purpose:** Searches all drives/directories on the system PATH and reports the location of the executable file that will run when entered at a DOS, OS/2, or Windows command prompt. Under Windows or OS/2, also reports the requisite dynamic link libraries (DLLs) and, optionally, the DLLs required by those DLLs and so on.

**Format:** FINDEXEC[/W[/V[/L/n]]/?] *program\_name*

**Remarks:** In locating *program\_name*, FINDEXEC uses the DOS search method under DOS and the OS/2 search method under OS/2. By default, a DOS-style search method is used from a Windows DOS Box prompt. The /W switch causes the Windows search order to be followed if and only if Windows is loaded.

Under Windows and OS/2, FINDEXEC also returns the names and locations of all DLLs needed by *program\_name*. Since these DLLs may require DLLs of their own in order to run properly, the /L/n switch can be used to extend the DLL search to the level designated by *n*. Alternatively, an exhaustive DLL search can be specified by using the /V (Verbose) switch.

**Note:** Certain DLLs, such as KERNEL.DLL and DISPLAY.DLL (in Windows 3.11) or DOS.CALLS.DLL (OS/2), are not actually files, but are simply created in memory at the time the operating system is loaded. For this reason, FINDEXEC cannot report the path to them.

The /? switch returns the full syntax for FINDEXEC, together with a brief explanation of each switch.

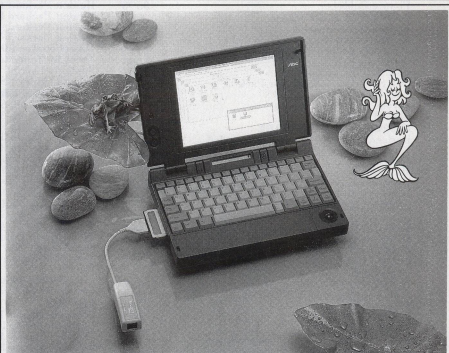
The executable and C-source files for FINDEXEC are available from Mag-disk under the filename FINDEX.ZIP. FINDEXEC.EXE is technically a specialised OS/2 1.x program designed to run under DOS, OS/2, and Windows. To recreate it from the source code requires a compiler that supports OS/2 1.x and the BIND.EXE program that was that was supplied in the OS/2 1.x Software Development Kit.

of OS/2 1.x. Faced with a lack of user enthusiasm for OS/2, the software industry saw no need to write applications that were compatible with both DOS and the tiny OS/2 1.x market. When IBM then released OS/2 2.0, with its excellent DOS emulation, FAPI was again deemed unnecessary, for now OS/2 could run almost every DOS application automatically.

Despite industry indifference, however, there is still a place for FAPI. It's the perfect format for utility programs such as FINDEXEC. Utilities tend to be simple, but they must find a place under DOS, OS/2, and, in

the future, Windows/NT. One FAPI utility can take the place of DOS, OS/2 and Windows utilities, and ensure that you won't have the wrong utility when you boot up a different operating system. FAPI utilities are also needed on OS/2 systems, the DOS emulation of which have been disabled with the PROTECTONLY switch.

FINDEXEC is a handy utility that works in all kinds of environments. Its services are useful on the smallest 256K PC as well as on the biggest server running OS/2. So stop guessing exactly what program actually ran and where it is; let FINDEXEC tell you. ☞



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# Operating environments

## Maximizing memory under DOS 6.0

DOS 6.0 is much more nimble than DOS 5.0 when it comes to handling memory, especially on 386 and 486 PCs. A default installation of DOS 6.0's EMM386.EXE driver provides more upper memory on the vast majority of PCs than a default installation of DOS 5.0's EMM386.EXE driver.

The DOS 6.0 version of EMM386.EXE also pools expanded (EMS) and extended (XMS) memory so that you don't have to split available memory between them; EMM386.EXE will dish out RAM to one program as expanded memory and to the next as extended memory. In DOS 5.0, you had to specify how memory would be apportioned

when EMM386.EXE was installed. If a program requested EMS memory when there was no more EMS memory, EMM386.EXE would not reallocate XMS memory to create more EMS memory. In DOS 6.0, it will.

The icing on the cake is MemMaker, which modifies your CONFIG.SYS and AUTOEXEC.BAT files to move TSRs and device drivers to upper memory. The process of converting your start-up files to take advantage of upper memory—a highly manual and often confusing procedure in DOS 5.0—requires almost zero effort in Version 6.0.

Still, there are some things MemMaker won't do. If you truly want to maximise the amount of RAM available to your application programs in DOS 6.0, you'll need to do some fine-tuning by hand after MemMaker has run its course. Here are just a few ways you can make more RAM available to RAM-hungry application programs in DOS 6.0.

### ■ Trim the fat from CONFIG.SYS

Converting DEVICE commands to DEVICE-HIGH is the obvious way to conserve memory through CONFIG.SYS. There are other ways, however, that are not so obvious. For example, if the CONFIG.SYS file on your 286, 386 or 486 PC does not contain a STACKS statement, you're losing almost 2K of RAM that DOS reserves for the purpose of providing additional stack space to hardware interrupt handlers. The extra stack space isn't needed on most PCs, so you can add almost 2K of RAM to the largest executable program size by adding the following statement:

**STACKS=0,0**

If DOS subsequently crashes on you after

displaying 'Internal stack overflow' messages, go back to the original STACKS setting. Note: If EMM386.EXE is loaded and a stack overflow occurs, you may receive an 'Exception error 12' message instead of an 'Internal stack overflow' message.

Another RAM eater in CONFIG.SYS is the LASTDRIVE statement. LASTDRIVE reserves room for logical drives up to the specified letter, and each logical drive requires 88 bytes of conventional memory. If you reserve space for more logical drives than you need to, you're wasting memory. CONFIG.SYS files that contain LASTDRIVE=Z statements are almost guaranteed to be wasting RAM. The solution? Set LASTDRIVE equal to the highest drive letter that you actually use, and make sure that all drive letters are contiguous.

For example, if your hard disk contains logical drives C: and D:, and you assign a pair of network drives the letters M and N, change M and N to E and F (and set LASTDRIVE=F) and you'll add more than 700 bytes to the largest executable program size.

Other notorious RAM eaters are the FILES and BUFFERS statements. On a 286 or higher, make sure CONFIG.SYS contains a DOS=HIGH statement and a DEVICE= statement loading HIMEM.SYS so that DOS will be loaded high (in the HMA), and set BUFFERS to 40 or less. This will ensure that DOS's disk buffers go in the HMA alongside the DOS kernel. As for FILES, experiment with different settings to determine how little you can get away with. If you have a 386 or 486, you can use APC's UMBFILES utility (available from MagDisk, see details on page 208) to move most of the system file table (SFT) to upper memory. Installing UMBFILES on a PC that uses a setting of FILES=40 adds about 2K to the largest ex-

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ecutable program size. If your FILES= setting is larger, you'll save even more by switching to UMBFILES.

If none of your programs use file control blocks (data structures used to store information about files in early versions of DOS), you can save a few more bytes of RAM by adding the statement

```
FCBS=1
```

to CONFIG.SYS. And if CONFIG.SYS contains a SHELL statement loading COMMAND.COM with a /E switch increasing the environment size, use the SET command to determine if you really need all that environment space. At the command prompt, type

```
SET ENVSIZE. $$$
```

Then type

```
DIR ENVSIZE. $$$
```

The size of ENVSIZE. \$\$\$ is a pretty good indicator of the number of bytes of environment space that are currently in use (for an exact count, subtract the number of environment variables from the file size and add 1). If this size is substantially less than the amount of environment space you set aside with the /E switch, decrease the environment size accordingly. Afterward, if you receive 'Out of environment space' messages when you run batch files, increase the environment size until the messages go away.

### ■ Optimise the load order

MemMaker uses a process called *bin packing* to determine into what regions of upper memory TSRs and device drivers should be loaded so that an optimal fit is achieved. For example, suppose you have a 4K UMB and a 2K UMB, and you want to load two 1K programs and a 3K program. If you put the two 1K programs in the 4K block, you won't be able to load the 3K program. MemMaker, though, is smart enough to put the two 1K programs in the 2K block, leaving the 4K block to hold the 3K program. If space in upper memory is tight, this could allow you to cram more TSRs and device drivers into upper memory.

Sometimes changing the order in which TSRs and device drivers are loaded will allow more of them to be loaded high, because some programs require more memory than their installed sizes indicate. For example, a TSR with an installed size of 20K could require a total of 40K immediately after it is loaded (the additional 20K might serve as buffer space). This TSR couldn't be loaded in a 50K UMB that already contained a 20K TSR, but it would load if it were loaded before the 20K TSR. MemMaker won't alter

the load order itself. It can't: too often the effectiveness of a TSR or device driver is dependent upon its position in CONFIG.SYS or AUTOEXEC.BAT.

If you're just a few kilobytes short of having enough upper memory to load one last TSR or device driver high, you may be able to fit it in by optimising the load order — shuffling the order in which TSRs or device drivers are loaded so that those with the biggest difference between maximum size and installed size are loaded first.

How do you determine what the maximum and installed sizes are? Simple. After running MemMaker, inspect the file named MEMMAKER.STS left behind in the directory where MemMaker itself is stored. For each TSR and device driver that it loads, MemMaker writes entries to this file denoting the maximum size (MaxSize) and installed size (FinalSize). To the extent possible, reorder commands so that programs exhibiting the greatest difference between MaxSize and FinalSize are loaded first. Then run LBL/MemMaker again to see if your changes made a difference.

Another way to squeeze out a few more kilobytes of upper memory is to start EMM386.EXE with a NOHI parameter. This prevents EMM386.EXE from loading part of itself into upper memory (by default, about half of EMM386.EXE goes into upper memory to reduce the driver's footprint in conventional memory). NOHI causes EMM386.EXE to use about 5K of conventional memory, but if an extra 5K of UMB RAM enables you to load a 40K TSR high, then you added a net 35K to the largest executable program size.

### ■ Use the C000h and F000h segments

By default, neither MemMaker nor DOS 6.0's EMM386.EXE driver will convert empty space in the range C000h to C5FFh to UMB RAM on ISA-bus PCs. You can use MSD (the Microsoft Diagnostics utility bundled with DOS 6.0) to determine whether your PC contains unused address space in this region and, if it does, use an I= switch to convert the empty space to UMB RAM. Start MSD and press M to display a map of upper memory. If the memory map reveals that segment addresses C000h through C5FFh are empty, add an I=C000-C5FF switch to the line that loads EMM386.EXE. Doing so will provide DOS with an additional 24K of upper memory. If only part of the address range C000h to C5FFh is empty, adjust the I= switch accordingly. For example, if MSD reveals that segments C000h through C3FFh contain ROM but that segment addresses C400h through C5FFh are devoid of RAM and ROM, add an I=C400-C5FF switch to the line that loads EMM386.EXE to create an additional 8K of UMB RAM.

DOS 6.0's EMM386.EXE stops its scan of upper memory for unused address space at segment EFFFh. You can extend the search to segment F7FFh by starting EMM386.EXE with a HIGHSCAN parameter. MemMaker will add this parameter for you, so if you've already run MemMaker, you shouldn't have to worry about it. Watch out, though: HIGHSCAN locks up some PCs. The easy way to recover is to perform a *clean boot* (DOS 6.0 lets you bypass CONFIG.SYS and AUTOEXEC.BAT by pressing F5 during startup). Then edit CONFIG.SYS to remove the HIGHSCAN switch.

### ■ Delete WIN= switches

If you allow MemMaker to optimise your system for DOS applications run under Windows 3.1, it may add one or more WIN= switches to the statement in your CONFIG.SYS file that loads EMM386.EXE. WIN= is similar to X= in that it blocks out regions of memory so that they won't be used by EMM386.EXE. Regions reserved with WIN= are used to hold Windows' translation buffers — areas below 1M that are used to pass data between protected-mode Windows and real-mode DOS.

The problem is that if EMM386.EXE is started with one or more WIN= switches and you don't boot Windows, you're potentially robbing DOS of several kilobytes of UMB RAM. The solution is simple: use DOS 6.0's multiple configurations feature to set up two separate configuration blocks in CONFIG.SYS — one that configures your PC to run Windows, and one that configures it to run DOS. Delete the WIN= switches from the DOS configuration. Remember to modify your AUTOEXEC.BAT file to support the dual configurations.

### ■ Eliminate the EMS page frame

While you're modifying your start-up files, remember that configuring EMM386.EXE as an EMS provider takes away 64K of UMB RAM to serve as an EMS page frame. If none of your programs uses expanded memory, load EMM386.EXE with a NOEMS switch to do away with the page frame.

If just one or two programs use expanded memory, you might elect to use the multiple configurations feature to set up one set of configuration statements that loads EMM386.EXE with a RAM switch, and another set that loads it with a NOEMS switch. Then you could reboot and select the RAM configuration prior to running an EMS-aware application program.

With some applications, you can have your cake and eat it too. If an EMS-aware program was written to Version 4.0 of the EMS spec, then, depending on how it was written, it may not require a page frame. It's possible to transfer data to and from EMS 4.0







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```
GOTO This
:      This is just a comment
... or is it??
ECHO If you see this line, the
line above is more than a
comment!
:This
:End
```

The supposed comment line has eight spaces between the colon and the word *This*, but DOS still treats it as a label. When seeking a matching label, DOS totally ignores any spaces or other separators between the colon and the label name. In order to safely use the colon to start a comment line, you must follow it with a second colon. A line that begins with two colons is not an executable line, nor is it a valid label.

I created the massive batch file COMNTST.BAT (Figure 1) to let you perform your own tests of the different methods for embedding comments in batch files. This batch file generates several other batch files for testing purposes:

- **SEMPY1\$.BAT**, a completely empty batch file;
- **\$\$SHORT1\$.BAT**, a batch file containing @ECHO OFF, a GOTO command, and the destination label for that GOTO command;
- **\$LONG\_1\$.BAT**, a duplicate of \$\$SHORT1\$.BAT, but with 256 text lines of about 50 characters each between the GOTO and the label;
- **\$REMS\_1\$.BAT**, a batch file containing the same 256 text lines as \$LONG\_1\$.BAT in the form of REM statements, with no GOTO command to skip over them; and
- **\$COLON1\$.BAT**, a duplicate of \$REMS\_1\$.BAT that replaces each REM with a double colon.

The \$LONG\_2\$, \$REMS\_2\$, and \$COLON2\$ batch files have twice as many text lines as the corresponding files above, while the \$LONG\_3\$, \$REMS\_3\$, and \$COLON3\$ files have the same number of text lines, but with the lines twice as long.

Figure 2 shows the result of running COMNTST.BAT. The double-colon comments turn out to be just a fraction of time faster than the version that uses GOTO to jump over the text! Note that making the lines twice as long and doubling the number of lines have about the same effect on the LONG and COLON versions, but differ for the REMS versions. Doubling the number of lines forces DOS to call the REM command twice as many times, while doubling the length of the lines doesn't change the number of calls to REM.

The purpose of COMNTST is simply to generate test files and compare their execution times, but it uses some interesting batch techniques to do so. To create the block of text separating the GOTO command from

its label in \$LONG\_1\$.BAT, COMNTST first creates the temporary data file TMP1\$.BAT, containing a single line of text.

It sets the environment variable *return* to the value *Return1* and jumps to the label BuildTemp. Batch lines at this label repeatedly double the size of the temporary file by first concatenating two copies of TMP1\$.BAT into TMP2\$.BAT and then concatenating two copies of TMP2\$.BAT back into TMP1\$.BAT. It's necessary to go back and forth between two files this way because the COPY command won't concatenate a file onto itself.

After eight doublings, TMP1\$.BAT contains 256 copies of the original line, and TMP2\$.BAT can be deleted. The next line uses GOTO to jump to the label which has its *name* contained in the e-var *return*. In this case, that name is *Return1*. The batch file lines between the label BuildTemp and the GOTO %Return% line act as a kind of subroutine, called four times by COMNTST.

After creating the temporary data file, COMNTST appends it to the \$LONG\_1\$ batch file. It then concatenates another copy of the data file onto \$LONG\_1\$.BAT to form \$LONG\_2\$.BAT. To create \$LONG\_3\$.BAT, it goes through the same process as for \$LONG\_1\$.BAT, starting with a line that's twice as long.

All of the text lines in the LONG batch files begin with REM. This doesn't affect their usefulness as text lines, but it makes it very easy to create the REMS versions of the three batch files. COMNTST.BAT simply passes each of the LONG batch files through the FIND filter, strips out any lines containing Start, and stores the result in the corresponding REMS batch file. \$COLON1\$.BAT, \$COLON2\$.BAT, and \$COLON3\$.BAT are created in the same way as the LONG batch files. Here the text lines begin with a double colon instead of with REM, and all references to the Start label are omitted. For comparison purposes, COMNTST also creates a completely empty batch file called SEMPY1\$.BAT.

All the files for testing are now ready; COMNTST just needs one more file to use in displaying the time. CURRENT.BAT will be invoked by a temporary batch file that executes the output of DOS's TIME command; for example, 'Current time is 12:00:06.65a'. The time itself becomes the third parameter, and CURRENT.BAT sets the e-var *ctime* to that value.

Only the seconds and hundredths of seconds are significant, so the next six

lines repeatedly strip the first character from *ctime*. Using the example time shown above, the final value of *ctime* would be '06.65a'. I could have made CURRENT.BAT sophisticated enough to remove that final *a*, but I didn't think it was worth the trouble.

Finally the testing begins! A FOR command processes the five descriptive strings EMPTY, SHORT, LONG, REMS, and COLON. For each of these strings, it calls COMNTST.BAT (represented by the %0 parameter) and passes it a filename created by prefixing a dollar sign to the string and appending \$1.BAT. It passes the descriptive string alone as a second parameter.

When COMNTST.BAT is called with parameters on the command line, the IF test at the top transfers control to the label OneTest. Batch lines at this label reset the system time to 0 and CALL the specified batch file 25 times. The next line passes a carriage return (produced by the command ECHO) to DOS's TIME command and redirects the output to the temporary batch file CHECKTIME.BAT.

When CHECKTIME is called, it in turn executes CURRENT.BAT, which sets the e-var *time* to the number of seconds elapsed since the command TIME 0. The last line reports the name of the batch file and the time it took to execute. Note that the batch lines at the label OneTest serve as another kind of subroutine!

COMNTST.BAT repeats this process with the test files created using twice as many lines, and using lines twice as long. It then deletes all the files it created, cleans up the e-vars, and terminates.

You can run COMNTST.BAT yourself to see how the different methods for embedding comments perform. If your machine is substantially slower than the 486/33 I use for testing, you may want to delete the first two executable lines from the BuildTemp subroutine. This will save you time because it

#### Test results

```
EMPTY batch file took 00.32a seconds.
SHORT batch file took 00.49a seconds.
LONG batch file took 03.57a seconds.
REMS batch file took 22.79a seconds.
COLON batch file took 03.46a seconds.
```

```
===== Now with twice as many lines =====
```

```
LONG batch file took 06.70a seconds.
REMS batch file took 45.53a seconds.
COLON batch file took 06.42a seconds.
```

```
===== Now with lines twice as long =====
```

```
LONG batch file took 06.59a seconds.
REMS batch file took 30.15a seconds.
COLON batch file took 06.26a seconds.
```

**Figure 2:** This sample of COMNTST's output shows that starting comment lines with double colons is much faster than starting them with REM



causes the test batch files to start with 64 text lines rather than with 128.

You can obtain the batch files mentioned in this column from MagDisk archived as COMMEN.ZIP (see page 208 for details).

**Neil J. Rubenking**

## A CAPSLOCK utility for Windows

I've been using the CAPSLOCK utility for nearly two years under DOS, especially whenever I've fired up Microsoft Word 5.0.

Recently I switched to Word for Windows 2.0 because I needed graphics, and since then CAPSLOCK hasn't worked. I've tried loading it before, during, after, and any other way you can think of, but nothing helps. There's something about the Windows environment that keeps CAPSLOCK from working. Do you have any suggestions?

**C.B. Lester**



Normally, using a shifted alphabetic key while Caps Lock is on generates a lowercase character. But doing so with CAPSLOCK.COM loaded generates a capital letter and turns off Caps Lock, just as it does on a typewriter. The CAPSLOCK utility works by taking over the keyboard interrupt; it gets information from the keyboard before the built-in keyboard interrupt handler. In most cases, CAPSLOCK simply passes the keyboard information to the previous interrupt handler, but if a Shift key happens to be pressed, it takes special action. Under DOS it's possible for many RAM-resident programs to peek at the keyboard information to see, for example, whether a hotkey combination was pressed. Each program simply passes the keyboard information to the previous interrupt handler in the chain.

This system breaks down under Windows, though, because Windows completely takes over the processing of keyboard input. It does not pass any information to any programs that were loaded previously. When Windows is running, it's totally in charge.

To modify the keyboard input, a program needs to hook into Windows, not into the keyboard interrupt.

Fortunately, there's at least one Windows solution: WINKEY, from DataGem software in the U.S. WINKEY can be configured to operate exactly like CAPSLOCK, but it works in Windows. It also lets you set NumLock and ScrollLock to be always on or always off, and optionally switches the Ctrl and Caps Lock keys. WINKEY is a shareware program, with a \$15 registration fee. You can obtain an evaluation copy of WINKEY.ZIP from MagDisk (see page 208 for details).

**Neil J. Rubenking**

# Hardware

## Should you push the processor?

I recently purchased a 486DX2/66 system through my company's employee purchase program. Friends who bought 486SX/25 systems discovered that they could get their systems to run at 40MHz just by moving a jumper on the motherboard. I tried moving the same jumper, but my system wouldn't boot. I was able to boot from a floppy disk, and when I ran QAPLUS diagnostic software, the system was indeed running at an incredible 88MHz! Since I couldn't get the rest of the system to work properly at this speed, I recently switched the jumper back and now I have to settle for a measly 66MHz again. Is there any way to make my system work at the higher speed?

**Rick Warrant**



To paraphrase a former president of the United States: you could do that, but it would be wrong. What you're trying to do is run the components at a higher clock speed than the system designers intended. This process is at least as old as microcomputers themselves, and is known as *pushing* the design. There is an honest difference of opinion about the merits of this practice, but most experts seem to oppose it.

In the early days of PCs, the system clock relied on one or more crystals on the

motherboard to provide timing signals. In the IBM PC, these were soldered in place. When IBM released the AT, however, it used a socket for the main crystal. Enterprising users discovered that they could easily replace this with a faster crystal to get improved performance. In fact, you could buy 'speed up kits', which were simply collections of crystals with different speeds. To find the fastest crystal your system could handle, you just kept swapping crystals with the next faster one until the system wouldn't boot, and then you'd use the last one that worked. For the IBM AT, this was usually an eight or 10MHz crystal. IBM wised up to this practice and began soldering the crystals into the later AT motherboards.

Over the years we've seen vendors push their designs in order to save money or get a performance edge in benchmark tests. Some even went so far as to sand off or paint over the speed ratings on their chips to prevent users from finding out the component's rated speed. While this meant that the components were being used outside the manufacturers' specifications, the systems did appear to operate satisfactorily.

Modern motherboards are designed to be far more flexible than their progenitors. The fact that you have the same jumper on your 486DX2/66 system as your friends' 486SX/25 machines is a strong indication that your systems are probably using the same motherboard. To save money, computer designers have come up with motherboard designs that can accommodate a

range of processors running at varying clock speeds.

Rather than use a different crystal for each processor speed, they use a single crystal and provide circuits that synthetically create the desired clock signal. The jumper you were moving was apparently setting the motherboard to operate at 44MHz, which in turn was doubled by your DX2 CPU for its internal operations. The fact that your friends are running at 40MHz with the jumper in that position indicates that there are other jumpers affecting the clock speed.

While it's true that you may be able to run your CPU at a speed faster than its rating, the same may not be true for the rest of your components. Early push designs demonstrated that there were limits to how fast expansion cards could be run, for example. Since your system's expansion bus speed is probably determined by the system clock speed, you may be running your cards faster than they're designed to go. It's also possible that you'll select a faster speed than the motherboard components can handle.

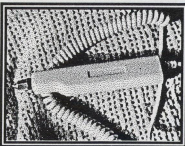
Despite all this, there's a chance you can make your push design work. Start by getting the technical details about the motherboard so you understand the function of all the clock speed jumpers, then advance the speed until it fails to work.

You might be able to go beyond this by changing the Advanced CMOS settings, if they are available, to lower the expansion bus speed to 8MHz or so. By carefully ad-



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vancing the system speed while keeping the expansion bus speed under control, you may get a free performance upgrade. Free doesn't mean that there is no cost, however. You will be running the system outside of its specifications. First and foremost, this will likely void your manufacturer's warranty.

More than that, though, is the problem of heat.

Heat is the number one enemy of electronic components, and running a chip at a higher speed increases the heat and can lead to temporary or permanent component failures.

The question to ask yourself is whether the boost in performance is worth the increased risk of system failure. Most people take a fairly conservative view of this equation and opt to leave their systems running at the speeds they were designed for.

**Alfred Poor**

# Programming

## How to trace programs with DEBUG

You've published many tips for using DEBUG, but here's a problem I don't think you've covered. IBM BASIC has a handy program-execution tracing function that displays program line numbers as they are executed. Now, I'm trying to learn about assembly and machine language using DEBUG, and it would be a great help to have a similar facility to trace the execution of program files, and either display the segment:offset flow of execution onscreen or write it to an ASCII file.

I've tried using DEBUG's Trace function, but it gets lost when it encounters an INT instruction. Replacing interrupt calls with NOP instructions prevents the following instructions from receiving results that the INT routine should be providing for them.

As a student on a budget, I'm not able to buy sophisticated programming tools. Do you have any suggestions?

**J. Bruce**



It seems that the two most common uses for DEBUG these days are assembling tiny .COM programs and patching text messages in other programs. Its original purpose — debugging programs — is almost forgotten. That's because DEBUG's features are

meagre indeed compared with the features of modern debuggers like CodeView and Turbo Debugger. But you can use DEBUG as a simple debugger if you learn just a few of its instructions.

As Mr Bruce notes, once a program is loaded into DEBUG, you can trace through it one instruction at a time with the T (for Trace) command. After each T command, DEBUG displays the values of all the CPU registers and the statement that will be executed next. However, if you trace into an INT (interrupt) instruction, you'll find yourself tracing the internals of DOS or the system BIOS rather than your program. When the next instruction that's displayed is an INT, use the P (for Proceed) command rather than T. This causes DEBUG to execute the interrupt call and then proceed to the next statement in your program.

G (for Go) is another useful instruction. Enter G followed by an address within your program and DEBUG will execute the program until it reaches that address and then stop. Actually, you can specify up to 10 breakpoint addresses after the G command, and DEBUG will stop when any one of them is reached. This instruction-at-a-time debugging can make it difficult to grasp just what the program is *doing*. Enter U (for Unassemble) followed by a starting address and DEBUG will unassemble the 32 bytes of code beginning at that address. You can control the length of the unassembly by also

specifying an ending address, or by adding the letter L followed by the number of bytes to unassemble. For example, the command **U CS:100 L 30** will unassemble the first 48 bytes (30 hexadecimal) of a program.

You can combine the U command with DOS redirection and some careful typing to use DEBUG as a disassembler for .COM programs. Here's how to do it: load the program into DEBUG and type RCX, then press Enter twice. The number displayed by DEBUG is the file's size. Write it down or remember it, then give the Q command to quit DEBUG. Now load the program into DEBUG again, but redirect output to, for example, an .LST file:

```
DEBUG MYPROG.COM MYPROG.LST
```

Because output is redirected, you won't see anything on the screen, but you can carefully type commands to DEBUG. Type **U CS:100 L** followed by the length value you noted, and press Enter. DEBUG will unassemble your program from the initial loading address (CS:100) for as many bytes as the entire length of the file, and the result will be stored in MYPROG.LST. Enter Q to quit DEBUG. You can print the .LST file or examine it at your leisure. DEBUG isn't a perfect disassembler — it treats every byte as code, even those meant to be data. But don't forget, it's free with DOS!

**Neil J. Rubenking**

# Word processing

## WP Win's problems with hi-res drivers

For the first few days after getting our new 486 systems, complete with WordPerfect for Windows and high-resolution graphics monitors, we suffered a lot of apparently random crashes. Macros and

Help wouldn't run reliably, and we couldn't zoom to 50 per cent reliably, among other problems.

WordPerfect's technical support recognised the problem, and told us to add the /FL switch. The switch was part of the 30 April, 1992 interim release of WordPerfect for Windows 5.1 and is meant to solve

problems that crop up with 256-colour drivers. Unfortunately, the switch doesn't seem to be documented.

To check if you've got the 30 April, 1992 interim release, launch WordPerfect, then choose Help About WordPerfect to reveal the program release date. To install the /FL switch, go to the Program



Manager, choose the WPWIN icon, then choose File Properties. Move to the Command Line text box, add a single space, then /FL after WPWIN.EXE, and Choose OK. Now WordPerfect will start with the /FL switch.

William J. Wolfe



This switch is actually documented in the README file in the 30 April, 1992 interim release. It's also available in WordPerfect for Windows 5.2, and is discussed in Appendix O of the Version 5.2 reference manual. However, the problem is still worth mentioning.

The documentation is a bit skimpy in any case, saying only that the switch prevents application errors with 256-colour drivers and that it fixes display problems with some font packages, including ATI Crystal Fonts. (According to WordPerfect, Crystal Fonts may appear 'chopped up' onscreen without

the /FL switch, with parts of characters missing.) It's important to note that these are two entirely separate classes of problems. WordPerfect says that without the /FL switch, you may get Unrecoverable Application Errors (in Windows 3.0) or General Protection Faults (in Windows 3.1), with some 256-colour drivers. As a separate issue, display problems, such as the problems with the ATI Crystal Fonts, may show up with any high-resolution driver — meaning anything more than 16-colour VGA.

It's also important to note that if you use the switch, you're giving up something as well, so you should use it only if you really need it. The FL is short for *flash*. The switch is so named because it turns off a WordPerfect feature that's meant to eliminate the flashing or flickering that you might otherwise see onscreen. Set the switch on — which turns the feature off — and you will see the current line flash off and on with each keystroke as you enter or edit text.

You may also be able to eliminate either kind of problem, without adding flickering, simply by changing to a driver with either fewer or more colours. And you may not need the /FL switch even with a 256-colour driver. A case in point: my system, which includes a Micrographics 32KVA board, has no problem with the Micrographics 1024 by 768, 256-colour driver, even without adding the /FL switch. But add the switch and the flickering becomes a problem.

In general, you shouldn't add the switch unless you have unexplained crashes with a 256-colour driver, or have unexplained display problems. And even then you might try switching drivers before deciding to put up with the flickering. According to WordPerfect, you are less likely to have problems in Windows 3.1 with drivers specifically written for 3.1. So if you have a driver left over from Windows 3.0, be sure to upgrade it — a good idea in any case.

M. David Stone

# Spreadsheets

## Monte Carlo simulation in Quattro Pro

Spreadsheets have enabled students of finance to do many types of analyses that used to require specialised software. In my teaching, I came across a technique that lets me do Monte Carlo simulations in Quattro Pro. These simulations repeatedly use random values in a calculation to approximate its results (Figure 3).

In cells A3..B7 of this worksheet, I have a table of potential sales figures. The table is named SALE\_DIST. The top-left value in this table is 0.0. The first value in the second column is 8.00, my lowest possible sales figure. The second value in the first column, 0.1, is my estimate of the probability that sales will be no greater than 8.00. The third value in the left column is the probability that sales will be no greater than the second value in the right column. The fourth value in the left column is the probability that sales will be no greater than the third value in the right column — and so on.

To the right of this table, in cells C3..D5, is a similarly constructed table of possible variable costs. This table is named VAR\_COST. Below these tables, in cells A10..F19, is a five-year cashflow model. The sales and variable-cost figures in this model are derived from @VLOOKUP formulas that use @RAND as the lookup index. The sales formulas, in C12..F12, are

6000\*VLOOKUP(@RAND,\$SALE\_DIST,1)

and the cost formulas, in C13..F13, are

6000\*VLOOKUP(@RAND,\$VAR\_COST,1)

Just below the cashflow model, in cells B21 and B22, are formulas that yield the net present value and internal rate of return for the model. I have named these cells NPV and IRR, respectively.

With the spreadsheet set up this way, I now have one possible outcome for my model. However, it is only one of many possible outcomes for this very simple case. To see some of the other outcomes, all that I have to do is hit the F9 key.

Simulation analysis is essentially a matter of collecting a sampling of possible outcomes. The trick for doing this turned out to be using a one-variable what-if table. I specified a

data table three columns wide. In the first column, where various values are usually tried, I leave the cells empty. In the first row of the second and third columns, I have the formulas +NPV and +IRR, thereby referencing the values in cells B21 and B22. When I issue the What-If command, I specify a blank cell as the input cell. The spreadsheet then calculates each row in the what-if table by putting a blank value in an empty cell and recalculating my calls to the @RAND func-

MONTE.WB1				A1..F22			
A	B	C	D	E	F		
1	PROBABILITY TABLES:						
2	SALE DIST	VAR COST					
3	0.0	8.00	0.0	5.00			
4	0.1	13.00	0.3	6.00			
5	0.3	14.00	0.7	9.75			
6	0.5	15.00					
7	0.8	15.25					
8	PROJECT MODEL:						
9	TIME	0	1	2	3	4	
10	INVESTMENT	(450,000)					
11	SALES		84,000	90,000	48,000	78,000	
12	VAR COST		30,000	30,000	36,000	36,000	
13	FIXED COST		53,000	53,000	53,000	53,000	
14	PRE TAX		1,000	7,000	(41,000)	(11,000)	
15	AFTER TAX		600	4,200	(24,600)	(6,600)	
16	TAX SHIELD		4,000	4,000	4,000	4,000	
17	SALVAGE					600	
18	CASHFLOW	(450,000)	172,600	188,200	75,400	154,000	
19							
20							
21	NPV		\$22,072				
22	IRR		12.64%				

Figure 3: The lookup table of sales and cost probabilities in the top of this worksheet is used to predict a business's cashflow over five years



MONTE.WB1				A24..F45		
A	A	B	C	D	E	F
24	SAMPLE ANALYSIS					
25						
26		+NPV	+IRR			
27		37,093	14.59%	MAX	111,968	
28		111,968	22.44%	MIN	(78,970)	
29		77,096	18.35%	RANGE	190,938	
30		27	10.00%	AVG	44,195	
31		15,829	11.79%	STD	50,158	
32		(14,303)	8.47%	COUNT	19	
33		90,394	19.94%	FREQ.DIST:		
34		101,881	21.46%	(75,000)	1	
35		104,755	21.65%	(80,000)	0	
36		37,516	14.11%	(45,000)	1	
37		87,563	19.58%	(30,000)	1	
38		7,038	10.88%	(15,000)	1	
39		83,633	19.24%	0	2	
40		14,079	11.44%	15,000	2	
41		(11,529)	8.73%	30,000	5	
42		84,397	19.37%	45,000	5	
43		22,129	12.77%	60,000	0	
44		69,121	17.42%	75,000	4	
45		(78,970)	1.28%	90,000	2	

**Figure 4:** The what-if table in A26..C45 leaves the first column blank to produce a Monte Carlo simulation, from which the statistical analyses and frequency distribution on the right are generated

tion! This gives me an instant sample of IRRs and NPVs. The sample can be arbitrarily large. As shown in Figure 4, it occupies the range A26..C45, but it could just as easily have spanned several hundred rows.

From this what-if table of outcomes, it's an easy matter to generate descriptive statistics and a frequency distribution. Such an analysis appears in columns E and F of Figure 2.

**Doug McCann**



Two very clever things are going on here. The first is Mr McCann's use of @RAND in conjunction with @VLOOKUP to generate inputs for the cashflow model. Keep in mind that when Quattro Pro evaluates the @VLOOKUP function, it looks for the first value in the index range that is larger than the function's first argument. Then it backs up one row in the table, moves to the right the number of columns specified in the function's third argument, and returns

returning any value between 0 and 1. If it happens to return anything up to 0.1, the function returns 8.00, which means there's a 10 per cent chance that the function will return 8.00. If it returns anything between 0.1 and 0.3, the function returns 13.00, which means there's a 20 per cent chance (0.3 to 0.1) that the function will return 13.00—and so on.

Thus, the outcomes in the sales and cost rows of the cashflow model reflect the probabilities as Mr McCann has defined them in the SALE\_DIST and VAR\_COST tables. If his estimate of the probability distribution changes, he has only to modify a few numbers in the SALE\_DIST and VAR\_COST tables.

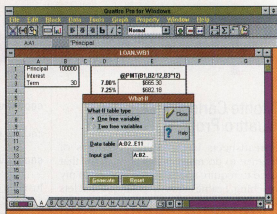
The second flash of brilliance is Mr McCann's use of blank (and therefore irrelevant) inputs to the what-if table. Normally, we use what-if tables to substitute a series of constants into one or more formulas. These constants — for example, principal amounts or interest rates for a mortgage — are arrayed in the lefthand column of the table, and each constant is fed in turn into the formulas in the first row of the table.

Figure 5 shows a typical simple one-variable what-if table, and Figure 6 shows the What-if dialog box. The table is defined as the range D2..E11. The input

cell is specified to be B2. The formula we want to evaluate — in this case a loan-payment formula, appears in E2, at the top of the second column, and is formatted in the Text format so that we can see what's being calculated in the table. Notice that the formula references the table's input cell, B2, as the second argument of the @PMT function. Also notice that the input cell itself is blank. This is the typical setup for this kind of what-if table.

When Quattro Pro generates the table, it substitutes each value in the left-most column of the table — 6.00%, 6.25%, 6.50%, and so on — into cell B2. Each time it does this, it calculates the formula in E2 and displays the result in one of the cells below E2. The result is a table that demonstrates the sensitivity of a mortgage payment to varying monthly rates of interest.

Now look again at the what-if table in Figure 4. Here the table is defined to be A26..C45, and the input cell is A25. Column A, the column that normally would hold the



**Figure 6:** Quattro Pro for Windows displays this dialogue box when you choose What-If from the Data menu

values to be substituted into the input cell, is blank. And the formulas at the top of the table — cells B26 and C26 — don't even reference the input cell. This is most unconventional! When this table is generated, Quattro Pro simply recalculates the formulas at B26 and C26 once for each position in the table. Since those formulas reference cells (B21 and B22) that reference other cells that make use of @RAND, the net effect is to build a table of random trials — a Monte Carlo simulation.

Vendors of true Monte Carlo spreadsheet add-ins are not going to be put out of business by Mr McCann's cleverness. Among other things, those programs allow you to run simulations with non-uniformly distributed random inputs. But Monte Carlo add-ins use memory and cost money, and to my knowledge, none of them works with either flavour of Quattro Pro.

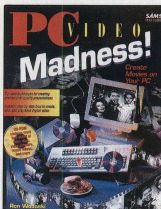
**Craig Stinson**

LOAN.WB1				A1..E11	
A	A	B	C	D	E
1	Principal	100000			
2	Interest			@PMT(B1,B2/12,B3*12)	
3	Term	30			
4			7.00%	\$665.30	
5			7.25%	\$682.18	
6			7.50%	\$699.21	
7			7.75%	\$716.41	
8			8.00%	\$733.76	
9			8.25%	\$751.27	
10			8.50%	\$768.91	
11			8.75%	\$786.70	
			9.00%	\$804.62	

**Figure 5:** This loan-calculating spreadsheet demonstrates the typical way what-if tables are set up

# Hot off the presses

*This month APC  
looks at a great new  
book on multimedia,  
as well as titles  
dealing with  
CompuServe,  
memory  
management,  
WordPerfect 6.0 and  
much more.*



## ■ PC Video Madness!

**Author:** Ron Wodaski  
**Publisher:** Sams Publishing  
**Distributor:** Prentice-Hall  
Australia  
**Telephone:** (02) 939 1333  
**Price:** \$81.95  
**ISBN:** 0-672-30322-1

There is something irresistible about an emerging technology. Anyone who cut their computing teeth with a CP/M machine they built themselves, is scornful of those who've never used anything less than a 386. My first computer had 256K of RAM and a flickering green monitor which made my eyes ache, but it was so exciting to use; piecing together my first Basic program was fun, in a way that shrink-wrapped, ready-to-run software will never be. I got a touch of the old, pioneering nostalgia when I opened *PC Video Madness!* sure, Video for Windows is a tiny, jerky picture with 8-bit sound, but it's new and it's fun.

If you yearn to explore the technological frontier, then Video for Windows will get you excited, and *PC Video Madness!* will tell you everything you need to get involved. The book begins with the definition of Video for Windows, which is a

Microsoft standard for recording and playing video clips under Windows, and takes you through every step, from using Object Linking and Embedding (OLE) to linking video into other applications, through special effects and tricks, right through to fairly advanced programming.

The book comes complete with a free copy of Nautilus, a



CD-ROM magazine (also pictured) which is particularly devoted to Video for Windows and similar multimedia matters. You'll need a machine that conforms to the Multimedia PC Standard (Version 1) to play the disk, but as long as you have the hardware you'll find lots of fun things on the CD-ROM, from games, shareware, music videos and programming tools, through to video clips of NASA moon shots (more nostalgia...).

My only slight quibble about this book is that it contains many pages of detailed program listings — however, with hundreds of megabytes of CD-ROM space available, padding the book out with printed program listings seems a real waste of trees. Apart from that, it's a fun book, packed with information and — by American standards — written in something approaching normal English.

**Jim Endersby**

## ■ Beyond the Limits: Secrets of PC Memory Management

**Author:** Bob Campbell  
**Publisher:** Sybex  
**Distributor:** The Law Book Company  
**Telephone:** (02) 887 0177  
**Price:** \$40  
**ISBN:** 0-782-11161-0

Bob Campbell has written a book devoted to memory management focussing on two of the best software-only utilities; QEMM and 386Max.

Sure, memory management is a complicated subject, and something best left to tinkers, gurus, boffins and high-priests of operating systems, but Campbell makes short work of the intricacies of manipulating the 640K limit we have all come to know and dread. Though the book is a little dated now, having referred to QEMM 6.02 and DOS 5.0 when QEMM is now up to Version 7.01 and DOS 6.0 is the current version, the basic principles remain the same.

The early part of the book is a treatise on PC memory and a historical background on what DOS has done and the ways that have been invented to circum-





vent the inherent limitations imposed on us by the operating system. This is an excellent passage that breaks down the technicalities with some colourful yet appropriate analogies to illustrate the mechanics behind the shuffling of bits and bytes by a processor. Campbell prefers not to touch on the whys of these limitations, which is a shame, but probably understandable given that the book is dedicated to the modest user.

Beyond the *Limits* works its way through on questions of configuration, the Windows phenomenon, limiters, and touches on DPMM, protected mode and real modes of operation in a sensible way before getting to the meat of the story.

Campbell introduces QEMM firstly with a rundown on its features and techniques for claiming extra memory (OPTIMIZE, VIDRAM, BUFFERS, STEALTH, FILES and LOADHI), and devotes a chapter to using Manifest, the acclaimed diagnostic utility that Quarterdeck Office Systems bundles with QEMM, but which sometimes appears somewhat gratuitous in its advice. The author then proceeds to mirror this treatment of QEMM when he looks at 386Max and its comparable applications like MAXIMIZE and ASQ. Campbell's topics even include online support from the vendors of these products, Quarterdeck and Qualitas.

In a way it is a shame the book has dated so quickly, which makes the asking price of \$40 an expense very hard to justify. But if you have come to use the products concerned but had a tough time coming to terms with the technical jargon of the official manuals, then this is the book that could help you make that quantum leap in comprehending what is happening next time you see that 'Out of memory' error message.

David Lin

## ■ CompuServe CIM / Running Start

**Author:** Bob Campbell  
**Publisher:** Sybex

**Distributor:** The Law Book Company  
**Telephone:** (02) 887 0177  
**Price:** \$35.95  
**ISBN:** 0-7821-1279-X

There has been a boom in recent times in online services including both paid and unpaid services. At the forefront of paid online services is CompuServe, which is the most subscribed to system in the world. Its popularity has been due in no small part to the breadth of services it offers from databases and software libraries, news services on sport, finance, industry and hobbies, to simple electronic mail and bulletin board discussion forums.



Accessing this wealth of potential information has been a problem because of the breadth of service it covers, especially here in Australia where the online charges are akin to highway robbery. Bob Campbell's book *CompuServe CIM/Running Start* makes the job a lot easier. For many this title will make the prospect of finding what you want a lot less painful in the hip-pocket region because time online is money spent, and fruitless time online is a waste of money.

The author takes a tutorial approach to the *Running Start* part of the book, preferring to focus on WinCIM, a software package distributed by CompuServe to run under Windows and specifically designed to access CIS (CompuServe Information Service). For anyone contemplating joining CIS, and who would prefer a Windows interface for the experience but is unfamiliar with CIS' structure, take a look at some of the tips

Campbell recommends. Some reference is made to the DOS version and third-party communications packages, but this is lip service for the most part.

The author takes you through some practical online exercises that introduce you to the menu and icon structure of WinCIM, and the various functions that are performed. Examples include how to email a destination on another network (like the Internet or MCI Mail, which are accessible through CIS' gateways). He also points out the pitfalls that can be encountered and billing arrangements, and deals with terminal emulation as a way of fudging access to CIS when you don't have WinCIM handy.

The other half of the book is a reference work devoted to alphabetically listing and describing the various services and forums available.

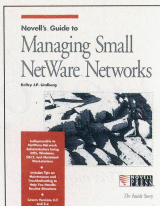
Unfortunately, as is the case throughout the *CompuServe* world, the book is unashamedly slanted toward the North American area where the majority of subscribers are, and the cheapest rates can be found. No mention is made whatsoever of the local arm of CIS which is run by Fujitsu, called *CompuServe Pacific*. However, Campbell's treatment of the principles behind efficient use of CIS remain — no matter where you are.

David Lin

## ■ Novell's Guide to Managing Small NetWare Networks

**Author:** Kelley Lindberg  
**Publisher:** Novell Press  
**Distributor:** The Law Book Company  
**Phone:** (02) 887 0177  
**Price:** \$50  
**ISBN:** 0-7821-1238-2

The author of this book would be the ideal System Administrator, having produced a guide detailing how a local area network should be put together using Novell's NetWare (2.2 or 3.x). Seen as a reference to best networking practice, it can be a valuable aid to the more human



LAN supervisors among us, with quirks of ill-planning and administrative mayhem.

The book details all facets of creating, extending and managing NetWare networks, but many of the principles and hints contained are relevant to all types of LANs. Even as a Macintosh LAN administrator, I found numerous conceptual explanations and suggestions enormously useful.

A small network is defined as one with less than 100 workstations. Each chapter provides an initial appraisal of issues to be addressed, justifications for actions, and then clear and concise exposition of all tasks necessary to network management. Chapter reviews can be used to ensure comprehension, while an introductory section explains basic networking concepts and elements, so that the reader doesn't get the feeling that they've missed something basic. A summary of the System Administrator's tasks is a helpful checklist from which to put work into perspective. The guide to the basics of installation is lucid and logical.

The guide to users and groups, and tailoring the network to user needs (through NetWare's advanced access controls, as well as login scripts and menu making) is very helpful.

Philosophical discussion of issues such as the need for access limitations mean that this book is relevant to all manner and size of network. Topics covered include: installation; organisation; user and group control and management; printers; network security; maintenance and backups; and incorporating Macintosh workstations into the



LAN. Basically, no NetWare administration task is too big or too small to be covered by this book.

As a thought-provoking conceptual guide, it is well worth a look for any LAN administrator.

**Dan Tebbutt**

## Visual Basic: Easy Windows Programming 2nd Edition

**Author:** Namir Shamas  
**Publisher:** Windcrest/  
McGraw Hill  
**Distributor:** McGraw Hill  
**Telephone:** (02) 417 4288  
**Price:** \$59.95  
**ISBN:** 0-8306-4450-4

*Visual Basic: Easy Windows Programming* provides a grounding in event-driven programming using Visual Basic for Windows. Using example applications located on the included 3.5in floppy, the author takes readers from the very basics of the language through to more complex work.

The book begins by explain-



ing the rationale behind Visual Basic. It covers the groundwork for creating applications before describing the more detailed features of the program in-depth.

Using Visual Basic, applications may be created that use text boxes, command buttons and menus. The book describes how to integrate these features into applications.

As your knowledge of the language grows, the book goes into more complex structures such as using multiple forms, printing, DOS screen emulation,

mouse control (including drag'n'drop), adding file management features and multiple-document interface (MDI) windows. Chapter 12, 'Fundamental Graphics', provides information on relevant graphics settings for Visual Basic applications as well as describing how to embed graphic icons.

The disk that comes with the book has a number of applications including a simple calculator, file viewer, text editor and contacts card. Through these simple applications a fast and fairly complete knowledge can be gained. A full listing of the programs is included in the text and the index contains all of the Visual Basic commands used.

As a first book in Visual Basic programming, this is a good choice. The use of examples to explain programming techniques and the clear, concise text make it an enjoyable book to work with.

**Ben Gerbolt**

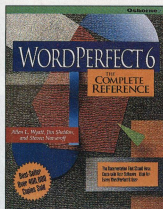
## WordPerfect 6 The Complete Reference

**Author:** A Wyatt  
**Publisher:** McGraw Hill  
**Distributor:** McGraw Hill  
**Telephone:** (02) 417 4288  
**Price:** \$58.95  
**ISBN:** 0-07-881901-6

If you are looking for a reference book that covers every possible facet of the new WordPerfect 6.0 for DOS, then this might be the answer to all your problems.

The opening chapter outlines both the program's improved and new features. Chapter 2, 'The Survival Kit', provides an introduction to the basic skills needed to use the program. Experienced WordPerfect users are advised to skip this chapter; even for beginners, it is limited and I would not suggest the purchase of this book to learn these basic skills. The book itself advises running the program's own online tutorial sessions.

The next section in the book — called a chapter even though it is 820 pages long — is an A to Z reference of features, commands and menu options for the program. Each item in the



reference contains a detailed description, a step-by-step guide, hints and related topics. This section, making up the body of the book, is well written and easy to follow.

Although all of the new desktop publishing, merge and macro features are contained in the A to Z reference, the authors obviously feel that the new WordPerfect features deserve an in-depth look.

A detailed explanation of desktop publishing terms, techniques and program features is given. These include step-by-step instructions to produce common documents such as letterhead, newsletters and brochures. The difference between macros and merging is explained, as is the method of accessing commands for both these features. Full descriptions and examples of these commands are given in this very thorough final chapter.

As the title suggests, this is a reference guide, not a tutorial book and should be treated as such. It is ideal for WordPerfect users who already have a firm grasp of the program's basics but need detailed guidance in certain features.

**Ben Gerbolt**

## Teach Yourself WordPerfect 6.0 for DOS

**Author:** Kris Jamsa  
**Publisher:** MIS Press  
**Distributor:** WoodsLane  
**Telephone:** (02) 979 5944  
**Price:** \$34.95  
**ISBN:** 1-55828-249-1

Kris Jamsa's *teach yourself*...

*WordPerfect 6.0 for DOS* is ideal for users from beginner to intermediate level. It is an expertly written and organised guide to the new DOS version of the world-leading word-processing package.

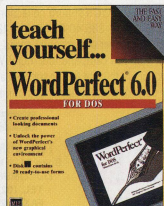
One of the first of what is sure to be a rash of tutorial books on the program, this publication takes the reader from the very basics through to the program's most advanced features. When combined with the extensive contents and index, this book can be used as both a tutorial and a reference.

Each chapter — there are 41 in total — begins with an outline of the work covered and concludes with a summary and a list of terms just learnt. The author has also made extensive use of screen captures, including dialogue boxes, to illustrate his work. This simple but effective layout allows thorough comprehension of the concepts given and the detailed instructions supplied in the text.

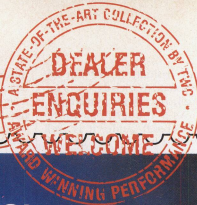
A companion disk ships with the book. It contains 21 preformatted forms that are useful for beginners. More experienced users, however, will probably prefer to produce their own. Advanced chapters of the book include all the necessary information to do this.

One of the great drawbacks of the book is the low price: \$34.95. For a publication that covers all aspects of the program, is over 500 pages long and has a companion disk attached, it is certainly great value. It is also probably the only WordPerfect tutorial book that you will need to buy to go from a beginner to advanced user.

**Ben Gerbolt**



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# Flashback

BY NATHANIEL TUNBRIDGE

*While the plot's a little lame,  
the action and graphics are  
hot in this PC release of a  
popular platform game,  
originally designed for the  
Sega MegaDrive.*

It's 2142 and you are Conrad Hart, agent with the Galaxia Bureau of Investigation, acting on orders from his Director, J Edgar Kleenex and . . . well, you know the kind of thing. Let's just say the plot of Flashback doesn't bear close examination, except by the writers of The Running Man (Stephen King) and Total Recall (Phillip K Dick), who would both find the ideas rather familiar. Never mind. What about the game? It's basically a platform game, but a particularly good one.

Having woken in a strange jungle, I began to explore the area. Threading my way through giant fronds, I wandered over to the left and discovered an impassable chasm. Any attempt to cross this resulted in a nicely illustrated sequence, showing me plunging to my death. There are quite a few graphic sequences that appear at crucial points throughout the game. In addition, every time you pick up an object or use a piece of machinery, there is an animation (one quickly tires of seeing the same thing again and again, and I wish the game's manufacturers had included an off switch for them).

Over to the right I discovered a little machine, like a tin can on wheels, that immediately began rolling towards me, producing a glowing rod as it did so. Not wanting to find out what the rod did, I turned back and headed in the only remaining direction; downwards. This proved to be far more productive. I discovered a holocube which, when activated, gave me vital clues regarding my lost past.

Over the next few screens I discovered a few things, including my pistol, which could be quickly drawn to administer a few quick shots, or, if the enemy was very close, a vicious clubbing could be administered (pistol whipping, of course!). Later on I discovered a magnetic cartridge that I used to activate the invisible bridge, once, I had recharged it in the energy generator of



course, which was about the same time I met that stranded tourist who wanted me to find his teleporter, which, of course, I only discovered by . . .

You get the idea. The game is full of little puzzles, often interconnecting, that have to be solved before progress can be made. Working on Expert level I finished the game in a surprisingly fast two days. Oh, and for those wishing to do the same but lacking the necessary codes, let me say that if you play the PICOCO you should write a FUGU (without the E), put it in a CAPSUL (without the E), and ZZZAP it away like a MANIAC. Is this cheating? NO WAY!

Flashback is a very pretty and exciting game. The running, jumping, rolling Conrad is, at 24 frames per second, one of the most beautifully animated sprites we've ever seen. The settings are colourful, the puzzles frustrating without being impossible and the gameplay entertaining and addictive. Flashback is one of the best platform games I've ever seen for the PC. Highly recommended.

**Nathaniel Tunbridge**

## Flashback

**Distributor:** Sega Ozisoft

**Telephone:** (02) 317 0000

**Price:** \$89.95



## ■ Blue Force

**Distributor:** Sega Ozisoft  
**Telephone:** (02) 317 0000  
**Price:** \$99.95

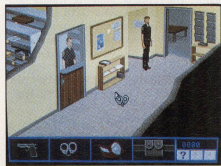
Blue Force is an action/adventure game created by Jim Walls, the ex-policeman who is responsible for the 'Police Quest' series. You assume the role of Jake Ryan, a rookie motorcycle cop in the good old USA.

The unsolved murder of your parents, 10 years earlier, comes back to haunt you as you team up with your father's ex-partner to track down the bad guys responsible. Although Blue Force was not produced by Sierra, the gameplay is almost identical. All of Jake's actions are controlled via a mouse; click the right mouse button and you bring up a police badge icon which contains all of the standard controls; use, look, talk-to and so on.

The action takes place in the seaside town of Jackson Beach. When you use your motorcycle you are presented with a scrolling map of the town. Simply move the mouse-pointer to the desired destination on the map and click.

Like the 'Police Quest' series you have to follow police procedure, so remember to radio for backup and so on, or you will come to an untimely end very quickly. One of the most irritating aspects of Blue Force is that you constantly find yourself being zipped up in a bodybag. Yes, Jimbo has also incorporated the Sierra trait of killing you whenever you make a mistake.

Graphically, Blue Force is of a high standard, no more so than most of today's games. The sound effects and music are also very good but they don't make up for what the game lacks the most — innovation. Yes folks, they may as well have called this game 'Police Quest 4'. There is absolutely nothing new to make Blue Force a standalone game. It seems as though the producers at Tsunami merely wanted to cash in on the previous success of Jim Walls rather than asking him to use his talents to create something with a little originality.



Overall Blue Force is an average game that will please those who are satisfied with pretty but predictable adventure games. If

you're looking for something new, look elsewhere.

**Julian Schoffel**

## ■ Campo's International Rugby

**Distributor:** Sega Ozisoft  
**Telephone:** (02) 317 0000  
**Price:** \$79.95

David Campese is without a doubt one of the greatest rugby players in the history of the sport. With his expertise you would expect the people at Ozisoft to come up with a truly excellent game. Unfortunately they have not. Campo's International Rugby sets out to be a technically accurate and atmospheric Rugby Union simulation. Rugby Union is a very fast moving and smooth flowing game, but if you are to have any hope of translating it across to the PC then it would seem to me that some effort must be made to segment play, otherwise anyone playing the PC game would have no hope of controlling the players on their team to a satisfactory degree. This is exactly what the producers of Campo's International Rugby have not done. Instead, they have come up with a game which moves too fast



to control adequately and the little control you do have depends largely on luck.

Graphically, the game is very shoddy, the sprites on the field of play are incredibly small and lack any distinguishing details. The game is supposedly mouse-driven, but the cursor automatically moves to the player on your team who is closest to the ball. The idea being that you click the mouse-button and the controlled player either tackles, passes, kicks or runs with the ball. You have limited control of the way lineouts and scrums are fed and of converting tries. These features are controlled using a system which bears an uncanny resemblance to that used in many golf games to control the swing of the club. The result is that you spend most of your time frantically clicking the mouse button with very erratic and mostly unsatisfactory results.

Other features of the game range from choosing your opponents or controlling

them, to touring overseas (Europe, British Isles, and so on) although I don't know why they bothered as all the playing fields look the same. After playing this game for a while I got the distinct feeling that the producers were working on a very limited budget, which is a pity because I am sure there are a great many Rugby enthusiasts who will buy this game and be extremely disappointed.

Campo's International Rugby looks like it was made six years ago; it does little or no justice to Rugby Union and to the name of the man they are using to promote it. At \$80 this game will leave you unimpressed and out of pocket.

**Julian Schoffel**

## ■ Maniac Mansion 2: Day of the Tentacle

**Distributor:** Sega Ozisoft  
**Telephone:** (02) 317 0000  
**Price:** \$89.95 (for either PC or CD-ROM format)

The first thing I should stress is that I played the CD-ROM version of the game; there is also a standard hard disk version which is essentially the same game without all of the enhanced sound effects and spoken dialogue. The plot goes something like this: you control the nerdy Bernard and his two roommates Hoagie and Laverne in their fight against the evil Purple Tentacle! Once merely a harmless creation of the mad scientist Dr Fred Edison, the Purple Tentacle drinks some toxic waste and suddenly finds itself endowed with a huge intellect and an insatiable desire to rule the world. Sound bizarre? Well it only gets stranger from here!

The game uses the same point-and-click interface as previous LucasArts games and is very simple to use. In the CD-ROM version there is no printed text, all of the dialogue is spoken. Thankfully, LucasArts has hired some real actors to do the job, so the end result is very entertaining rather than downright corny.

Graphically, the game has a comic-book style which suits the quirky plot very well. The characters under your control are quite hilarious; apart from Bernard there is the heavy metal roadie Hoagie, and Laverne, a neurotic medical student. Part of the plot development sees them transported through time, so they inevitably get to interact with some famous American historical figures with amusing results. One rather innovative feature of the game is that you often have the option of switching back and forth between which character you control.

In summary, 'Day of the Tentacle' is a refreshing and often humorous addition to the adventure game genre.

**Julian Schoffel**

# Tools for renovators

BY JANICE TONG

*Not many of us have lots of money to spend on design and decorating at the moment, but these software packages aim to make improvements a little more accessible.*

## Expert Home Design

Expert Home Design for Windows is a compact and comprehensive package for layout design. It offers a multitude of functions and utilities for the user to make realistic drawings.



As the area you work on is scaled, the floorplan can easily be extended outside the screen area without the user losing track of the proportion and size of their work.

Accessing the tool display box, which contains a series of self-explanatory icons, is easy. The user simply clicks on, say, the 'box' tool and then drags the mouse across and down the page from the 'zero' or 'origin' point (which is the 0.0 point in the x and y axis) to create the outside walls of the house. There is an automatic position counter for accuracy in scaling.

Wall thickness can also be set for creating a more realistic look. After using each command, make sure the 'pick' tool is clicked on, to avoid unwanted lines or marks on the layout.

Windows and doors require a steady hand, precision drawing, and a lot of fiddling — still, a lot easier than plotting on graph paper. By grouping the different sets of features, they will remain in place and can not be accidentally moved or deleted. The user can also zoom in and out to adjust finer details.

The library of clip art for different rooms is extensive. The icons can be dropped into the floorplan, then moved, resized or duplicated. Sections can be cut out and pasted into different areas. Colour panels and fill patterns are sophisticated. Numeric values can be entered in the hue/saturation/luminosity sections for tone, depth and brightness. This creates optimum effect for the final product.

An add-in is Mortgage, a basic accounting package that lets you estimate loan amount, building and material costs, adjustable and fixed repay-

ments, insurance and interest rates. This is a bonus for the user who is serious about building their own house.

Expert Home Design is fantastic value for money, suitable for both first-time users and people familiar with design and architecture.

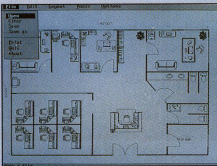
## Expert Office Design

Expert Office Design is from the same maker as Expert Home Design.

This package operates in the DOS environment, it is easy to use, especially for first timers, and with the help of pull-down menus, it is foolproof.

The graphics, colours and fill patterns in this package are a lot more basic and limited. However, it does provide a good starting point for amateurs in layout design.

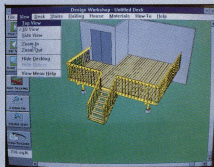
The user has a variety of tools, a library of furniture and office equipment which can be dropped into the main plan. The tools allow the user to draw an area quickly and effectively. They include 'wall', 'box', 'circle', 'freestyle' and 'line'. These attributes can then be altered in appearance by changing their thickness and shading. Text and colour can then be added for a finished look.



The whole plan can then be moved, rotated and altered by a few clicks of the mouse. It is an easy-to-use package; for those who remember doing technical drawing at school, this package is just that, without the ink-stained fingers, expensive rulers and pens, and most importantly, minus the headache when you make a mistake.

## Design and Build Your Own Deck

Design and Build Your Deck is from Books That Work. The 'How-To' section covers the different



functions available in the package, which includes a 3D view of the deck you design. At first glance, this package seemed to offer a lot, however, I was disappointed that it doesn't deliver what was promised.

For example, I found it necessary to build the house around the deck, not the other way round. If you are looking to design a free-standing deck or a deck partially attached to your house, then it is feasible to use this package — but even then it has its limits.

As the deck is on supports, it is not possible to adjust individual stilts holding up the deck. The user can either raise or lower all of the supports, but this does not allow for any natural slope of the land.

This package is well presented, with advertisements in the 'How-To' sections and enlarged diagrammatic representations of each step, from digging the footholds to hammering a nail.

In terms of design, this package is very limiting and unimaginative. It allows the user little room to move. It is better to invest in an architect and do the job properly.

### Expert Home Design for Windows

**Distributor:** Electronic Arts  
**Phone:** (075) 911 388  
**Price:** \$79.95

### Expert Office Design

**Distributor:** Electronic Arts  
**Telephone:** (075) 911 388  
**Price:** \$29.95

### Design and build your own deck

**Distributor:** Sega/Ozisoft  
**Telephone:** (02) 317 000  
**Price:** \$129.95

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# Tuning in to the wireless LAN

BY CHRIS BOWES

*Wide area wireless connections promise to free users from the office while making sure they still stay in touch. Question is, where is it all at?*

**D**on't wireless LANs sound great? Now you can roam freely round the office, or jump in the car, drive to the beach, and log in to the network from there. If only Toshiba made a waterproof notebook!

But Toshiba doesn't make a waterproof notebook, and no such wireless LAN exists. The furthest you can go with existing products is 240m from the nearest access point, the wireless LAN equivalent of a cellular phone network base station.

Driving down the beach is definitely out. For truly mobile users, low-speed data services and unreliable low-speed modem links over the cellular network are all that are on offer.

Even within an office, or more likely, around a warehouse, hospital, or some other location where a traditional 'wired LAN' is impractical, there's a significant premium attached to wireless LAN technology.

That said, we are now seeing the first wave of products, and that's going to give us a good idea of what we may be able to look forward to when prices drop.

The cheapest product announced is

Xircor's Netwave system. That's going to set you back around \$850 for each PCMCIA or pocket adaptor and \$1750 for an access point servicing a recommended 10 users. That's around \$1000 a user — not bad if it was available now, which it isn't. "Around Christmas," say the people at Wholesale Technology, one of Xircor's distributors. The major negative for this system — the low-power radio signal used only has an in-building range of 40-50m. Bandwidth per user is one megabit per second (Mbps); throughput is down 20 per cent on this. On the plus side, power usage is minimal, and thus suited to portables.

Recently approved for use in Australia is NCR's WaveLAN system. A couple of early users have already purchased systems that list for \$1969 for a WaveLAN network interface card and \$5195 for a WavePoint bridge. Like all of these systems, the bridge, or access point, connects to a wired LAN or file server. Total cost of NCR's system is well in excess of \$2000 per user. Its advantages over the Xircor system is 2Mbps bandwidth per user and 240m range, and it's available now.



## NEW Systems

### NSW

**/dev/nul** (02) 415 2207. MV. Brett Selwood. V.22, V.22bis, V.32, V.32bis. FidoNet 3:711/517. 24 hours.

**Dark Triumph BBS** (02) 833 1958. P. Harold de Leon. V.22bis. 11pm-7am daily.

**Osborne BBS** (02) 844 8445. P. Matt Crowe. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

**The AsYuM** (02) 389 1060. P. Andrew Thom. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

**The Door5 Bbs** (02) 602 9075. P. Richard Kirbo Smolik. V.21, V.22, V.22bis, V.23. 24 hours.

**The Final Frontier BBS** (02) 899 9191. P. Stephen Thompson. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:711/457. 24 hours.

**The Talon BBS** (02) 631 5994. P. David Baptista. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:713/802. 24 hours.

**ToyTown BBS** (02) 411 2721. MV. Noddy. V.22bis, V.32, V.32bis. 24 hours.

**MacCoast** (066) 28 5354. MV. Nathan Willis. V.22bis. 24 hours.

**The Jungle BBS** (049) 56 2438. P. Jared Quinn. V.22, V.22bis. FidoNet 3:622/415. 11pm-6am daily.

### Vic

**City Limits** (03) 876 3353. M. Bernard Holkner. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:633/369. 24 hours.

**Club-Link BBS** (051) 43 0154. MV. Ron Heffernan. V.22bis, V.32, V.32bis. 7pm-8am daily.

**Cockatoo Chat BBS** (059) 68 9229. P. Tom and Mary Jane Kirby. V.21, V.22, V.22bis.

### Format of listings

Entries in our listings contain the following information: system name, phone number, access, operator's name or alias, supported modem standards, network node number and hours of operation.

The access code may be P(Public), M(Members/registered users only), MV (as M, but with limited Visitor access).

The modem standards are V.21 (300bps), V.22 (1200bps), V.22bis (2400bps), V.23 (1200/75bps), V.32 (9600bps) and V.32bis (14400bps). WorldBlazer/TraillBlazer and HST are de facto high-speed standards.

The four main BBS networks in Australia are FidoNet, INtNet GTnet and WorldNet.

These networks provide a way of sending public or private messages between boards, whether they are in the same suburb or half a world apart.

### Submissions

The information in this column is provided by the Australian BBS Registry. It is presented in good faith but APC cannot take responsibility for its accuracy. New information and updates should be sent to the Registry Coordinator in your state.

You can also post BBS List news onto the EchoMail conference, BBS\_NEWS, which is available nationally as a public area. Netmail BBS List enquiries to Rodney Creer at 3:713/317. Postal registrations to PO Box 731, Penrith NSW 2751.

**National Rodney Creer, Australian BBS Registry**, (047) 35 6789, FidoNet: 3:713/317, PO Box 731, Penrith NSW 2751

V.23. 24 hours.

**Country Fire Authority BBS** (03) 262 8347. P. Darren Treloar and Coralie Jenkin. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:633/211.5. 24 hours.

**Danger Zone** (03) 364 3107. P. /X\Na\Nac. V.32bis, HST, 9am-8am daily.

**Fineline BBS** (03) 569 5722. P. Kevin Berlyn. V.22bis. 24 hours.

**Gallifrey BBS** (03) 716 1204. P. The TimeLord. V.22, V.22bis. 24 hours.

**MoneyMan BBS** (03) 735 3830. P. The IRS. V.22, V.22bis, V.32. 8am-10:15pm daily.

**Network BBS** (03) 803 6498. MV. Arthur Stevens. V.22, V.22bis, V.32. 24 hours.

**ROMORDISK BBS** (03) 459 1424. M. Bradley McLeod. V.22bis. 24 hours.

**Secret Service BBS** (03) 794 9375. M. Mike Geisler. V.22, V.22bis, V.32, V.32bis. 24 hours.

**The Extreme BBS** (03) 791 7281. M. Felony. V.22bis. 24 hours.

**The H.O.G. BBS** (03) 836 6950. P. Bu Rei Don. V.22bis. 24 hours.

**The Hidden Garden BBS** (03) 583 6173. P. Greg Kerr. V.22bis. FidoNet 3:633/271. 24 hours.

**The Polymorphic BBS** (03) 775 2363. P. Ewan Humphrey. V.22, V.22bis. FidoNet 3:632/551. 24 hours.

**Violent Crimes** (03) 562 1008. P. Sudden Death. V.22bis, V.32, V.32bis. FidoNet 3:632/553. 24 hours.

**What Woke The Neighbours?** (03) 306 1595. M. Mik Nicholson. V.22, V.22bis. 11:30pm-7:30am daily.

### ACT

**In Gaia We Trust** (06) 288 0036. P. Ian Metcalfe. V.22bis. FidoNet 3:620/259. 24 hours.

### Qld

**Neeson's Node** (077) 23 2559. M. Doug Neeson. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:640/705. 24 hours.

**PC Online** (07) 341 7985. MV. Adam Pearce. V.22bis. 24 hours.

**NSW** Greg Kuhnert, 2000 and Beyond AliveBBS, (02) 544 7123, FidoNet: 3:712/513

**Vic** Richard Stocks, The Offline BBS, (03) 808 4510, FidoNet: 3:633/374

**ACT** Craig Gibson, Caught in the ACT BBS, (06) 292 8288, FidoNet: 3:620/252

**Qld** James Collins, The Galaxy GateWay Computer System, (07) 812 0727, FidoNet: 3:640/230

**SA/NT** Grayham Smith, Oracle PC-Network, (08) 234 0791, FidoNet: 3:800/804

**WA** Graeme Platt, 1990 Multiline, (09) 370 3333, FidoNet: 3:690/254

**Tas** Roy Austen, Tassie DataBank, (003) 44 9762, FidoNet: 3:670/301

### SA

**Bushido BBS** (08) 284 0745. P. Barry Walton. V.22, V.22bis. 24 hours.

**Milliways** (08) 381 5035. V. John Simmons. V.21, V.22, V.22bis. FidoNet 3:800/863.10. 24 hours.

**Soft/2 Shareware BBS** (08) 370 7339. M. Trevor Lampre. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

**South Coast BBS** (085) 56 3919. P. David Deeprose. V.21, V.22, V.22bis, TrailBlazer. 9pm-8am daily.

**The REBEL WILDCAT BBS** (08) 250 5110. P. David Lloyd. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

### NT

**CyberNet IV** (089) 45 3638. MV. Graham Smith. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:850/103. 24 hours.

### WA

**Black Ice BBS** (09) 250 7322. P. Matthew Murray and David Kitson. V.21, V.22, V.22bis. FidoNet 3:690/358. 24 hours.

### Updates

### NSW

**Angus & Robertson OnLine** Temporarily offline.

**Arcadia** (02) 744 8466. P. Walter Snogfurl. V.21, V.22, V.22bis, V.32. 24 hours.

**Big Whopper BBS** Permanently offline.

**Citadel:TNG** (02) 568 3904. P. Jedd. V.21, V.22, V.22bis. 24 hours.

**Fire&Ice CBCS** (02) 399 5545. MV. Jonathan Michaels. V.22bis, TrailBlazer. FidoNet 3:712/808. 24 hours.

**Graphics Warehouse BBS** (02) 743 8249 Multi-Line. MV. Michael Flint. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:713/901. 24 hours.

**PinkPod** (02) 331 6370. MV. Lorenzo di

Medici. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:712/519. 24 hours.

**RUNX** Permanently offline.

**The Twilight Zone** (02) 750 6117. P. Chris Keladis. V.22bis, V.32, V.32bis. FidoNet 3:712/416. 24 hours.

**Abacus BBS** (065) 41 1808. P. Barry Smith. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:622/416. 9pm-7am daily.

**Public & Aviation BBS** Permanently offline.

**Vision 3000** Permanently offline.

## Vic

**Connection Point** (03) 311 6974. M. Norm Hamilton. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:635/736. 24 hours.

**Data Warehouse** Permanently offline.

**Melbourne 64 BBS** Permanently offline.  
**Melbourne Remote Systems / ViewCom** Possibly offline.

**Midnight Madness** Temporarily offline.

**Satellite BBS** (03) 842 7150. V. Alistair Simpson. V.21, V.22, V.22bis, V.32. FidoNet 3:633/269. 24 hours.

**Sound FX** (03) 748 8552. M. Bob Crockford. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:633/270. 24 hours.

**Spectrum Radio BBS** (03) 455 1309. MV. Michael Evans. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:632/393. 24 hours.

**The Bridge BBS** (03) 525 6995. P. Darren Merritt and Tony Langdon. V.21, V.22, V.22bis. FidoNet 3:632/367. 24 hours.

**The Heart of Gold BBS** Permanently offline.

**The Last Frontier** Possibly offline.

**THE REX BBS** (059) 76 2142. P. Jamie Howarth. V.21, V.22, V.22bis, V.23. FidoNet 3:632/550. 24 hours.

## ACT

**Alchemy ACT** (06) 294 0547. MV. Phil Pope. V.21, V.22, V.22bis, V.32. FidoNet 3:620/242. 24 hours.

**Catnip BBS** Permanently offline.

## Qld

**Albatross** (07) 398 7038. P. Ryan Murphy. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 4pm-11am weekdays; 24 hours weekends.

**Dead Dead Fred BBS** Permanently offline.  
**Glenray Computer Services EBBS** Possibly offline.

**The Dead Zone BBS** Permanently offline.  
**The Unicorn** Permanently offline.

**Welcome to the Pleasuredome** (075) 78 7652. P. Eric Cassimatis. V.21, V.22, V.22bis, V.23, V.32bis. FidoNet 3:640/939. 24 hours.  
**Wild Magic BBS** Permanently offline.

## SA

**OmegaBBS** (08) 283 0553. P. Peter Conner-

ty. V.22, V.22bis. FidoNet 3:800/879. 24 hours.

**PAX — Public Access Unix** Permanently offline.

**The Attic** Possibly offline.

## WA

**Cyclonic Tower BBS** (09) 364 6055 Multi-Line. MV. Karl Ferguson. V.21, V.22, V.22bis, V.23. 24 hours.

**flame BBS** Permanently offline.

**Razor Board W.A BBS** Temporarily offline.

**The Legendary BBS!** Permanently offline.

**Total BBS** Permanently offline.

## Tas

**The Solar Connection** (003) 83 4530. MV. Jason Camino. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:670/303. 10pm-8am daily.



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Borland C++/ApplFwk	\$685
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Paradox 4 .....	\$749

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Lotus 123 3.4 .....	\$460
Lotus/Windows 4 ..	\$450
Lotus SmartSuite ..	\$599

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Commence 2 .....	\$545

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WordPerfect \$399 !

CA Clipper 5.2 \$749

OmniPage Pro \$1299

Excel 4 ..... \$385 |

FaxMaster OCR .... \$199 |

Office/Win ..... \$675 |

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Project/Win 3 ..... \$649 |

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dBase 4 rel 2 \$695 !

FoxPro 2.0 \$249 !

Corel 3 \$290

TimeLine 5 \$490!

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PageKeeper ..... \$1450 |

Word/Windows 2 .. \$415 |

Ventura 4.1.1 ..... \$749 |

WordPerfect/Win ... \$399 |

### UTILITIES ETC

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Norton Desktop 2.2 .. \$175 |

PC Tools/Win ..... \$165 |

Harvard Graphics  
\$535

Lotus SmartSuite  
\$599

FrameMaker \$1075

CA Clipper 5.2 ..... \$749 |

FoxPro 2.5 ..... \$590 |

SuperBase ..... \$790 |

SuperBase Dev ..... \$1290 |

Ventura AdPro ..... \$calt |

Ventura DataBase Pub \$385 |

ATI Graphics Ultra Pro \$calt |

FaxMaster OCR  
\$199

Sony Trinitron  
17" & 20" Scall

Novell 4/25 user  
\$4890

Illustrator \$590

All prices current as at 25/6/93. All goods subject to prior sale. Availability may be limited. E&OE.

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## ■ Conferences/Meetings

### September

**6 Software Quality Association of NSW** The first international conference on Software Quality Management organised by the British Computer Society SQM special interest group will be presented by David Wilson of the University of Technology. Venue: Coopers and Lybrand House, Conference Centre, 25th floor, 580 George Street, Sydney. *Enquiries, Mark Goddard, tel: (02) 285 5217*

**7 PC Users Group (WA)** This group meets on the first Tuesday of each month at 5.30pm. Desktop publishing is the topic for the above date, to be held at Grace Vaughn House, 227 Stubbs Terrace, Shenton Park, WA. *Enquiries, Publicity Officer, PC/Micro Users Group, tel: (09) 328 3328*

**7-8 Negotiating Information Technology Contracts 1993** This two-day seminar will be held at the Southern Cross Hotel in Melbourne and will provide delegates with a better understanding of the legislation surrounding information technology contracts. Topics will include: key issues in contract negotiations; the latest in copyright and intellectual property law; the contract as a project management tool and protecting your secrets. *Enquiries, IBC Conferences, tel: (02) 319 3755*

**8 & 22 Multimedia User Group** This group meets every second and fourth Wednesday of the month at the Mount Waverley Community Centre, Melbourne. The meetings enable members to discuss any difficulties and help each other in specific areas of expertise. Other benefits in being a member include: monthly newsletters; access to cheaper commercial hardware and software; and a place to buy, swap or sell your computer components. *Enquiries, Andrew Barfoot, tel: (03) 758 4822*

**21-22 Telecommunications Outsourcing & Virtual Private Networks** The Sydney Hilton International Hotel is the venue for this two-day course, designed to give delegates an insight into the major issues surrounding outsourcing. Topics will include: new horizons in telecommunications management; outsourcing the management of telecommunications systems; analysis of the arguments for and against outsourcing and VPNs — private solutions on public networks. *Enquiries, IBC Conferences, tel: (02) 319 3755*

**28 Sydney PC Users Group Windows Special Interest Group** Known as WinSIG, this group meets on the fourth Tuesday of the month at the Bowler's Club of NSW Main Auditorium, 1st Floor, 95 York Street, Sydney at 6pm. This evening will feature a presentation by Claris on ClarisWorks for Windows. *Enquiries, Chris Virtue, tel: (02) 564 1202*

**28-30 The AUUG 93 Conference and Exhibition** To be held at Sydney's Convention and Exhibition Centre, this event will be beneficial to Unix and Open users. The emphasis of the conference will be on successful applications and implementations of open systems technology. Topics over the three days will include: results and networking, standards and software management and security, respectively. *Enquiries, Conference details, Liz Fraumann, tel: (02) 943 3542, Exhibition details, Wael Poda at ACMS, tel: (02) 332 4622*

**30 Australian Windows Users Group (Victorian Chapter)** This non-profit self-help group, with a membership of 250,

meets on the last Thursday of each month. Victorian meetings are held at 7/468 St Kilda Road, Melbourne. *Enquiries, Stephen Moignard, tel: (03) 532 0684*

## ■ Training

### September

**6-7 Token Ring Connectivity Certification** This is one of many courses offered by MPA Education, with the option of onsite training which can be tailored specifically to suite your organisation. This two-day training program will take place in Melbourne at a cost of \$800. *Enquiries, MPA Education, tel: (03) 724 4444, (02) 906 4499, (07) 832 4065 or (09) 474 1988*

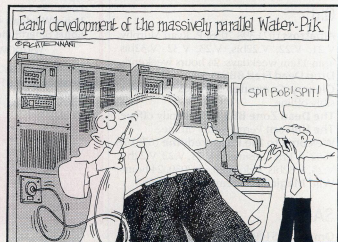
**15 Advanced Windows 3.1** This course, to be held in Perth, will provide the trainee with an understanding of how to optimise the system under Windows and how to manage Windows applications. Management Technology Education provide numerous training programs in each state. *Enquiries, MTE, tel: (09) 324 1142, (03) 629 5811 or (02) 261 5555*

**16 Using a Personal Computer** This course is designed for new users and will demonstrate how IBM-compatible computers operate. During the hands-on training session, experience will be gained in word processing, spreadsheets and database programs. All courses are held in Adelaide. *Enquiries, WEA Computer Training Centre, tel: (08) 223 1272*

**16-17 Mastering Information Overload** This is a two-day workshop designed to improve delegates' ability to retain and apply information; reading speed; memory; vocabulary; note-taking skills; ability to teach others, and effectiveness and efficiency at work. *Enquiries, MTE, tel: (02) 261 5555, (03) 629 5811, (07) 221 3611, (08) 231 3048*

**20-21 Introduction to Quattro Pro for Windows** Franklin Collins in Melbourne provides training tailored to the needs of the individual user. The above course is just one of many offered by this reputable training and development company. *Enquiries, Franklin Collins, tel: (03) 600 1577*

*Diary Data is compiled by Helen Summers, tel: (02) 288 9123. For inclusion in this section, fax details of your upcoming conference, meeting, exhibition or training course to Helen on (02) 267 4903, or by email to HSummers%5542840@mcimail.com*





# 6 multi-featured portables from as little as **\$2,395** (RRP inc. tax)

The colour Philos 44 (below left) and the Quaderno 33 (below right) are packed with innovative features – sound handling... PCMCIA slot... integrated mouse... separate numeric keypad...



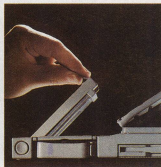
A separate numeric keypad — as on desktop keyboards.



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# PC Super Market

SEPTEMBER 1993

**Comparison charts**  
**Sound cards**  
**CD-ROMs**  
**Graphics adaptors**  
**386 machines**



## Guide to Buying Direct

Part 1 of our comprehensive guide to  
choosing and buying products off the page

**How to buy  
Multimedia products**

**Price Watch:  
hard disks, fax modems**

### Companies inside ...



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**CTM GROUP**

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# TOMORROW'S NOTEBOOK TODAY



## Technical Specifications

### Processor - Easily Upgradeable

- Intel 486-25/33/50/66 Mhz Microprocessor
- Intel CPU built-in Maths Co-Processor (except 486SX-25)

### Memory

- 4MB of RAM expandable to 32MB
- 8KB Internal Cache Memory
- 128KB Flash ROM BIOS, config software

### Storage - Easily Upgradeable

- 120MB 2.5" V/Coil Hard Drive
- 200MB/340MB upgrade options
- Internal Hard Disk Cache
- 1.44MB 3.5" Slimline Japanese Disk Drive

### PCMCIA

- 2 x Type II Slots for Fax/Modem & Ethernet
- 1 x Type III Slot for removable Hard Drives

### Display - Easily Upgradeable

- 512KB RAM WD 32 bit Local Bus Accelerator
- Graphics Adaptor Exp. to 1MB - 1024 x 768
- 512 Colour 10" Active Matrix TFT Backlit LCD
- Upgradeable 10" 64 Grey Scale Backlit LCD
- Simultaneous LCD and CRT display capability
- Hot Key Brightness/Contrast adjustment

### Keyboard & Trackball

- Full size slimline 85 key keyboard
- Inverted T cursor layout - tactile feel
- Built-in 16mm high resolution Trackball

### Physical Dimensions

- Weight: 2.9kg including Battery
- Length: 282 x 218 x 51mm

### Extras

- Rugged Non-Scratch plastic casing
- Optional 14,400 baud internal Fax/Modem

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The Sphere Futura is the Notebook you need now, for tomorrow. Futura's exceptional upgradeability and flexibility gives you the power to enhance its features as your needs change. Making this the Notebook you'll want for years to come.

### Upgradeable Intel CPU

With your Futura Notebook you can pump up CPU performance from Intel's 486SX-25Mhz to their 486DX2-66Mhz CPU.

### Upgradeable Screen Display

In the same way you can upgrade the LCD display from Monochrome to the new Enhanced Colour Double Scan STN display, up to the most advanced Notebook screen technology available today, Active Matrix TFT Colour. This Notebook's upgradeable screen is different to the competitor's systems. This one won't fall apart.

### Upgradeable Hard Disk Drive

With its removable hard drive, you can upgrade disk storage capacity, allowing multiple hard disk drives. That means you can have several users share your Notebook, each with their own hard disk. That's flexibility.

### Upgradeable Flash ROM BIOS

Even the BIOS can be upgraded with our Flash ROM feature. As new peripherals or BIOS upgrades are released, simply run the configuration utility diskette to instantly update your Notebook's BIOS. Obsolescence has just become obsolete.

### Faster than a Desktop. At a cheaper price.

Your scorching 486-66Mhz Futura gives performance seldom found in desktops. Speed through your time intensive applications up to 1000% faster than any 386 portable.

### Future Expansion. Today.

For the ultimate in expansion and connectivity, Futura offers you the latest PCMCIA Type III input device standard.

Plug in up to two of the latest "Credit Card" size peripheral cards - modems, network adapters, memory cards, or the new removable 10.5 mm PCMCIA Type III voice Coil hard drives.

### 800% Faster Graphics Performance.

Your Futura is the first notebook to bring you true 32 bit Local Bus performance. Using Western Digital's 32 bit Local Bus graphics allows your Notebook to harness the 486's true 32 bit power.

### User Friendly Ergonomics.

Your Future comes with a built-in 16mm Trackball. For your comfort, we've placed the Trackball "dead-bang" in the centre, unlike our competitors who seem to find all sorts of interesting places to put theirs, except the right one.

The 2.9Kg Futura is a light, powerful portable Notebook wonder. When combined with a full-size external monitor and 101 key enhanced keyboard, the Futura PortaDesk computer system offers all the capability of a desktop computer, at a cheaper price. Just compare our prices with Dell, Compaq and IBM.

With Sphere's Futura you're protected from wasting money on a Notebook you might soon outgrow. Protected too by our 5 Year Limited Warranty.

So if you want a high quality "State of the Art" Notebook computer system, your choice is now crystal clear, Sphere.

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#### 64 GREY SCALE LCD

486-25MHz	486-50MHz
<b>\$2785*</b>	<b>\$3325*</b>
\$3342 INC TAX	\$3990 INC TAX
486-33MHz	486-66MHz
<b>\$3185*</b>	<b>\$3585*</b>
\$3822 INC TAX	\$4302 INC TAX

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#### 512 ACTIVE MATRIX COLOUR

486-25MHz	486-50MHz
<b>\$5485*</b>	<b>\$5985*</b>
\$6582 INC TAX	\$7182 INC TAX
486-33MHz	486-66MHz
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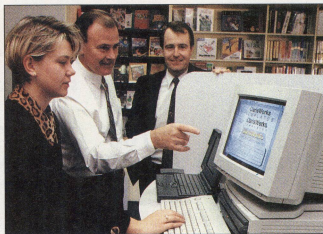
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# C O N T E N T S



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New and improved

## REGULARS

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### News

Included in trends and technology this month are reports on the Star Micronics post sales support programme, for their printer range with the Five Star Club; Harvey Norman's plans to open retail computer superstores; unexpected demand for multimedia PCs sold through K Mart; GUICare's dismissal of Microsoft's comments and Borland's introduction of a support programme for local developers.

10

### New and improved

Announcements of new products and upgrades.

20

### Price Watch

The price of hard disk drives has never been cheaper. This month, the Price Watch team investigates the best bargains available in hard disk drive upgrades. We also look at the costs involved with fax modems and the sales spiels you may encounter.

22

### Company Profile

Logical Solutions has been on of Apple's most successful resellers. Recent announcements including supplying Compaq products and Fujitsu acquiring a shareholding in the company indicate the company is broadening its marketing strategies.

## FEATURES

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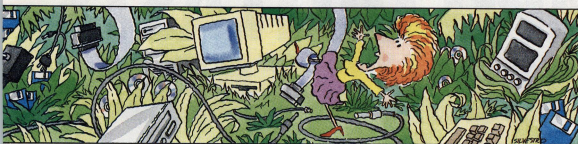
### Buying Direct

PC Super Market introduces the first part of a comprehensive, step by step guide into buying through the direct channel. This month we look at what you should know before you buy.

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### Multimedia Buyer

Multimedia offers some of the most exciting applications for the computer. However, putting a multimedia kit together can be quite a daunting exercise. We examine the components of a multimedia kit and provide you with a few key rules to ensure that you get the most out of your dollar.



## BUYER'S SERVICES

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Multimedia presentations are greatly dependant on the quality of the display and the speed of graphics. Here, we provide tabulated information on graphic adaptors available, including information on the video processor.
- 52** **CD-ROM**  
In this table, we look at CD-ROM drives and list their features including access speed, interface and pricing.
- 63** **386-based desktops**  
Although being superceded by 486-based computers, 386 machines still provide the processing power to run your Windows applications. We provide a comprehensive listing of 386SX and 386DX machines on the market.

### Special note

If you are a manufacturer or distributor and your products have not been listed in the PC Super Market Buyer's Guide tables, please contact Richard Rodrigues on (02) 288 9122.

## PC Super Market

SEPTEMBER 1993

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# TEMPO OUTLASTS PASSING FADS



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## Technical Specifications

### Processor

- Intel 486-25/33/50/66 Mhz
- SX/DX/DX2 & P24T Pentium ZIF Upgradeable
- Intel Maths Co-Processor - except 486SX-25
- CPU Cooling System, reduces heat 60%

### Architecture

- 32 bit Genuine VESA Local Bus
- Mitac Multi-Layer 1 grade Mainboard
- Heat Resistant Turbo Chipset

### System Memory

- 4MB Japanese 72 Pin Simm FastRAM
- Expandable to 256MB RAM
- 256KB Write Back Sram Cache
- 8KB 1st Level CPU Cache

### Storage Devices

- 210MB Voice Coil Drive with 256KB Cache
- 1.2 or 1.44MB Panasonic Floppy Drive
- 2.88MB Floppy Disk Drive Support

### Monitor

- Mitac 15" XGA Flat Screen MultiScan
- 36% more viewing than 14" monitors
- Low Radiation VESA 72Hz Non-Interlaced
- Digital Control - 20 Memory Modes
- Adjustments for:  
Pincushion, Barrel, and Trapezoid

### Graphics Adapter

- 1MB 32 bit VL Bus GUI Accelerator
- S3 86c805 Graphics Engine
- 48 Times Faster than VGA
- 1280 x 1024 XGA/SVGA resolution
- 16.7 million colour support

### Enhanced Security Features

- Multi-Layered, Password Control for:  
Boot-up, Keyboard Lock, Serial & Parallel  
Ports, Read & Write for Floppy & Hard  
Drives, Virus Protection
- Sphere Power-Surge Protection Cable



Sphere's all new Tempo Series computer systems have enough upgradeability to outlast passing fads. Our competitors for instance.

At Sphere, we anticipate new technology even before it's introduced.

Now you can change your computer's features as often as you change your mind. But before you change your mind and start planning to upgrade this scorching PC, you should know that it already comes with a bundle of features.

### Billion Dollar Partner

Our unique UPstation multi-layer mainboard is upgradeable to an incredible 256MB RAM and 1MB Sram Memory Cache. The Tempo Series is specifically manufactured by Mitac for Sphere. Being a strategic partner with one of the world's largest computer manufacturers, with an annual turnover of nearly one billion dollars and an ISO-9001 Quality Assurance accreditation means we bring you quality on par with Compaq and IBM at about half the price.

### Pentium-level Technology

Our UPstation mainboards come with a genuine Intel ZIF (Zero Insertion Force) socket. Thus we give you. upgradeability starting from our 486SX-25 model, right through to the 486DX2-66 and, in the future, Intel's Pentium-level technology. Don't settle for just an OverDrive socket. According to "PC Magazine", a system that can accommodate Intel's future generations of processors "is an advantage that you are likely to appreciate".

### Colours So Bright You'll Need Sunglasses

With Sphere's S3 86C805 VESA 32 bit Local Bus Graphics Accelerator, you'll see 16.7 million colours that scream through Windows applications up to 48 times faster than VGA. This amazing graphics engine is up to 10 times faster than other VL Accelerators, and is capable of running XGA's highest resolution.

### 15" of Pure Paradise

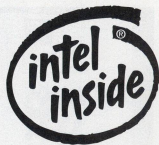
We also bring you one of the most awarded monitors in the world. The 15" Mitac Digital Processor Control Multiscan monitor supports "flicker free" 72Hz display and provides up to 36% more viewing area than the outdated 14" monitors.

### Enhanced Security Features

All Tempo computers come with multi-layered built-in security with password control for boot up, keyboard lock, read and write control for hard and floppy drives, serial and parallel port access rights, as well as virus protection ... in short, complete security.

### Easy Upgrade Path

The Tempo PC is the world's easiest computer to upgrade. Our unique Modular Design allows you to quickly and inexpensively upgrade your hard drive, install a CD-ROM, add more memory, upgrade the CPU, or even the entire system board. Service and upgradeability has never been easier. So, if you live for the future, and not the past, order your Tempo system today. That's pretty easy too.



486-25MHz <b>\$2445*</b> \$2934 INC TAX	486-50MHz <b>\$2945*</b> \$3534 INC TAX
486-33MHz <b>\$2785*</b> \$3342 INC TAX	486-66MHz <b>\$3145*</b> \$3774 INC TAX



# PEERWARE ... The New Connectivity Sensation

If it runs on NetWare  
it runs on WEB Peerware  
... at half the price!



WEB Peerware ushers in a new and exciting era of connectivity for Windows and DOS users.

Less resource-hungry than major network systems and more powerful and flexible than "lite" network imitations, WEB Peerware provides users with exceptionally quick, easy and inexpensive access to sharing group resources and maximising productivity.

Use your tape drive to back up any or all connected PCs, let everyone share the information on your CD-ROM, transfer files between any PCs, send e-mail to other users, spread your programs and data over all PCs to maximise hard disk resources ... and save on costs. Share any printer on any PC.

In other words, you can connect to any computer (peer), printer and other device in your workgroup ... and run any software that runs with NetWare.

Quick installation, Novell support if you need it (including encrypted passwords), bootrom, support for all standard network cards, blazing speed and **unconditional 60 day money back guarantee** make WEB Peerware the best connectivity system you can buy.

The WEB Pairware Kit (2 users) is very inexpensive and includes a parallel cable to connect your PCs. Licence packs for network cards run from 2 to 900 users.

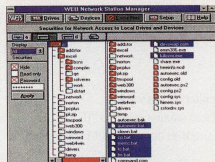
Call or fax now for a FREE WEB trial disk ... or order the real thing.

A complete WEB Pairware Kit for 2 PCs costs just \$199. That includes a special 2 metre parallel cable to connect the PCs. WEB Pairware is a great option for you to enjoy Peerware benefits quickly and easily ... or to sample WEB as the prelude to a more extensive Peerware installation.

## There's nothing else with the features of WEB for WIN & DOS...

- 5 minutes software installation on any PC
- The fastest data throughput in the industry
- Support for IPX and ODI - use WEB with virtually any network card or topology
- Peer-to-Peer Workgroups and/or... Client-Server Workgroups
- Mix NetWare and WEB servers
- Seamless access to NetWare Servers
- Add users to NetWare server inexpensively
- No dedicated server required
- Transparent operation to all users
- DOS and Windows interfaces enable each station to run both interfaces and have full access to all network resources in both environments
- Use normal DOS commands
- Run XT, 286, 386 and 486 PCs
- Share unlimited printers
- Share unlimited plotters
- Share all your disk drives (inc. CD-ROM)
- Backup all PCs to a single tape drive
- Up to 255 clients per server
- Up to 900 network nodes
- Electronic Mail built-in
- Extensive security safeguards for access to disks, directories and files
- Detailed context-sensitive help
- So easy to use, it eliminates the need for expensive network consultants
- 5, 10, 15, 30 & 100-user licenses
- DOS Pairware Version (2 PCs - Serial Ports)
- WIN Pairware Version (2 PCs - Parallel Ports)

WEB Peerware includes a Burst Mode and Dynamic Data Compression, providing the fastest data throughput in the industry for heavy-load applications like multi-user database and CAD systems.



You have powerful and intuitive security for access to local files and devices. Simply click check boxes to apply or remove securities.

## Network interface Cards With 5-year Warranty!

To ensure you a long and trouble-free installation, we supply only the highest quality Network Interface Cards.

A five year warranty brings with it the peace of mind of knowing your original investment is protected at all times.

## FREE WEB Peerware Trial Pack

WEB Peerware is also available as Shareware for you to sample for a limited period. It can be found on many BBSs.

Please give us a call if you can't find it on your favourite boards and we'll send you a copy on disk.

## Read what the experts say...

"WEB... is easily the best peer-to-peer [network] we have used to date. It's generally easy to install, it's application friendly and it has a clean interface and full on-line documentation. We believe this peer-to-peer network will emerge as a market leader..."

"Installation is extremely easy to perform... WEB's on-line help is amongst the best we've seen..."

"The interface has a friendly feel and it's pleasing to look at. We rate it as excellent..."

"The point-and-click redirection ability and the separate e-mail window makes this package very good to use when you work with Windows..."

"If NetWare is the final frontier, then WEB is going where no peer-to-peer has gone before. NetWare compatibility is one aspect in which the WEB [network] excels..."

LAN Magazine (US), May 1993

"We recommend WEB to you unconditionally..."

Small Business Guide to Networking

"If there was such a thing as a next generation" in the peer-to-peer industry, WEBCORP's WEB 3.0 would be setting the standard."

LAN Times Review LANtastic 4.1, NetWare Lite 1.0, Powerlan 2.2 and WEB 3.0

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Software Etc, Suite 303, 4 Help Street, Chatswood NSW 2067

**SOFTWARE ETC**  
Computer Networks Printer Sharing Business Software



# PRINTER SHARING WITHOUT A NETWORK



## Inexpensive Data Link lets you share your printer with up to 20 PCs

**Data Link** is a modular low-cost solution for simple printer sharing requirements. It lets you share your printer with up to 20 PCs.

Start with two PCs and keep adding more as your needs grow.

The Data Link's fast 6,250 cps transmission speed (that's 375,000 characters a minute or 180 average A4 pages of text!) gets your job down the line pretty quickly.

And as for distance, there's no real barrier. You can print up to 1500' (450 metres) away.

A 25' (8m) RJ11 (thin, telephone-style) cable is included for each PC. Installation is as simple as plugging the "transmitter" unit into the printer port of your PC, the "receiver" unit into the printer and connecting them with the cables supplied. There's no way to make a mistake or a wrong connection.

Being parallel, there are no baud rates or parity to set. There is no software to run. No confusion. Just plug it in and start printing.

Use the **Data Link Distance Extender** if you'd like to direct-connect to a parallel printer a long way away. This consists of a Data Link transmitter for your PC, a receiver for your printer and 25' (8m) of cable. If you'd like to go further, we can supply you with inexpensive cable up to 450 metres long.

If a single printer is what you'd like to share ... and you'd like to do it automatically ... there's no quicker, easier or more economical solution than the Data Link system.

## Share Wonder lets up to 36 PCs automatically share up to 6 printers with no software. Just dial the printer you want...

**Share Wonder** lets you share up to 6 printers between 36 PCs simultaneously! That means everyone in your office can get instant access to all your LaserJet, PostScript and dot-matrix printers.

The Share Wonder's modular concept allows you to start with just the the number you need for the PCs and printers you now have and never need to worry about expansion. Just add printer or PC Share Wonder modules as your needs grow. It's really that easy!

That lets everyone share all your printers ... all the time.

You can connect to a printer 300 metres away, through your parallel printer port, at a very fast 10,000 cps and using inexpensive telephone-style cable.



Share Wonder includes a simple 6-way selector to let you "dial" the printer you want, from your desk! Just turn the knob to select your printer. It even has lights to let you know if the printer is busy or out of paper ... to save time.

And installation is a snap, just like connecting a printer. Plug a "transmitter" into the printer port of each PC and a "receiver" into each printer. Then connect them with the cable (8m) supplied for each PC ... and start printing.

## Need A Simple Data Switch?

If your sharing requirements are only minimal, a Manual Data Switch may suffice. These are available with 3, 4 or 5 ports, parallel or serial. Basic but very inexpensive.

## Byteway & Bytelink provide TURBO POWER for multi- platform and network sharing



Want to share peripherals and transfer files between PCs ... to off-load print jobs from your existing LAN to improve its throughput ... to access your expensive printers from multiple platforms (DOS, OS/2, Unix, minis etc)?

The **Byteway Turbo** and **Bytelink Turbo**

series offer extensive features for fast, heavy-duty applications.

Multi micro-processors for increased data throughput. Password controlled access to ports and configuration. Parallel and serial ports. Serial to parallel conversion and vice versa. Bi-directional serial ports with modem support. Dynamic memory allocation. Field up-

gradeable memory to 4MB. File transfer capability. E-Mail etc etc.

The Byteway is available in 4, 8 and 12 port configurations. The Bytelink comes with 24.

For straightforward fast printer sharing, the **Byteway Turbo** allows 2, 4 or 8 PCs to share a parallel printer. 128K to 1Mb memory. Supports up to 30 metre cables.

For further information call 02-419-7455 008-024-971 Fax 02-419-7391

Software Etc, Suite 303, 4 Help Street, Chatswood NSW 2067

**SOFTWARE ETC**  
Computer Networks Printer Sharing Business Software



# Five stars for service

Star Micronics offer best-sales service programme

**S**tar Micronics is offering registered owners of its new and near-new printers the opportunity to join the Five Star Club. Benefits include extended supplier warranty and enhanced support.

A once-only fee of \$36 gives users three-year warranty on all printer parts, including print heads, access to online technical support and printer drivers — drivers that come direct from Japan online, according to Star Micronics' general manager Max Fredericks.

At a time when software vendors are moving away from free support, the Star Micronics decision seems anomalous, offering to pro-



vide each customer more time per printer, at no ongoing cost.

But Fredericks is philosophical. "Maybe [the soft-

ware companies] feel that their support overheads are higher than ours. In fact, most of the 'printer' problems we support are software problems. When the technical people get involved it's at a level of 'my printer doesn't work', but a little further investigation usually leads to the applications the customer is using, and more likely than not it's a question of software, not the printer per se. We do it though, and we just have to take it on the chin, because whether it's an applications problem or a hardware problem, what the customer sees is that the printer doesn't work. It's our reputation on the line."

The trend of going to third-party maintenance, he emphasises, doesn't suit his company or its customers. "At the end of the day, we wear the reputation for the service [the third-party] provides. It's our logo on the printer, and that's what people remember."

Star Micronics doesn't envisage the level of service required to meet the Five Star Club undertaking becoming a burden. In fact, Fredericks says the company has dramatically improved its service profile over the past 12 months, so formalising it as the Five Star Club seemed to make good sense.

The market for impact printers is in decline, dot matrix printers are no longer featuring on business wishlists, so to maintain market share companies like Star Micronics must look outside the issue of technology alone, offering instead price point and service advantages.

"Our new customer base is the growing number of home computer users buying a printer for their small inexpensive PC. We can definitely compete in that marketplace,

## Computers' R' Us, says Harvey Norman

Harvey Norman banks on computer superstores

**T**he concept of computer warehouses took off like a rocket in the US, but failed dismally in Europe, because of the differences in the buyer culture. Australia is about to experience its first experiment with acres of technology under one roof, with computer superstores to be established by Harvey Norman.

The two stores, in the Sydney suburb of Auburn and in Newcastle, will offer the widest array of PCs, software, cabling and consumables yet seen under one roof, according to the company's computer co-ordinator, Tony Gattari.

The stores, adjacent to existing Harvey Norman stores in these two locations, will house an estimated \$5 million worth of stock and will occupy more than 15,000 square feet of space.

The concept of the retail superstore is based on the successful foray by toy warehouse Toys 'R' Us into the bulk display of toys in the US. Gattari hopes that the trend is transferable to computers, and that it will offer sufficient options to suit any buyer, need and budget. A limited Game Zone will provide games of imagination and learning rather than the model set by the Sega/Nintendo range. "We're not a toy shop, it's an important distinction," said Gattari.

Research by the company has shown that the biggest seller on the existing Harvey Norman computer department shelves is a 50MHz 486DX/2 machine, confirming the company's instinct that the market has changed. While previously, the bulk of Harvey Norman customers were home computer users with less powerful software and game purchases on their shopping lists, today's buyer may equally be a small or medium-sized business, with more idea of its requirements, looking for a better price.

Superstores may eventually replace the computer departments in Harvey Norman stores. Once the Auburn store is up and running, the department within the store will be phased out. It is a natural expansion, says Gattari. While computers originally represented only three per cent of the company's business, a 150 per cent increase over the last year has seen the proportion rise to 11 per cent.

The Superstores will be open seven days a week, from 8.30am until 5.30pm, and until 9pm on Thursdays. Watch out for some spectacular opening specials when the stores open in October.

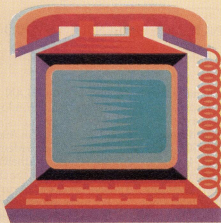
For more information, contact Harvey Norman, on (02) 647 2611

# Corporate arrogance no deterrent, says GUICare

*GUICare dismisses Microsoft's implied watchdog status*

**G**UICare marketing manager Samantha McCormick has described as patronising and arrogant comments attributed to the recently departed managing director of Microsoft, Mr Gary Jackson.

The comments, related to the controversial issue of paid support, were interpreted by McCormick as Microsoft's attempt to impose its disciplines on the rest of the supply and distribution channels. "We support Microsoft and we are happy to talk to the company about establishing accreditation programmes, as acknowledged standards are good for the industry as a whole. But to imply that we need their assent before making our own support and service decisions is beyond tolerating."



The comments related to GUICare's decision to remain independent, sup-

porting other products as well as Microsoft's. The comment was patronising, according to McCormick, in that it implied that GUICare required Microsoft's permission, and further implying that Microsoft was looking after the industry by ensuring that companies like GUICare were staffed by sufficiently competent technicians.

"We are sufficiently proud of our reputation as to make Microsoft's scrutiny superfluous, and to imply that they are our watchdog is totally unfounded," McCormick said.

"We will continue to provide our support, toll-free, 24 hours a day, 365 days a year, whether Microsoft says so or not," she added. To contact GUICare, phone 008 813 294.

because we provide cost effective equipment, and a level of service which provides a comfort zone. We're talking about time users, who buy more than a printer; they also buy some of the company's time to help them understand how to make best use of it. If that costs us some marketing dollars, it will have been well worthwhile." Members will receive regular product information

and technical updates, and a Five Star Club newsletter. Special member prices on third-party products through authorised resellers will also apply. And while there are no user group wine and cheese nights scheduled, Fredericks has plans for expansion. "We are negotiating with other providers to join the agreement and extend better service into other areas"

## Borland kicks off programme for local developers

**A** new support programme for local software developers by Borland Australia is now up and running.

Called the Borland Developer Connection, the programme costs \$695 annually and includes Borland's KnowledgeBase CD, a priority hotline for professional developers, and a monthly technical newsletter.

KnowledgeBase CD is a complete technical database on CD-ROM of Borland software products, including

the latest product data, sample source code, bug fixes and workarounds.

According to the company, Borland Developer Connection members will also have access to an Australia-wide developer registry and discounts to events such as the Borland World Tour. Borland officials also stated that special quarterly developers forums are also to be scheduled for members.

For more information contact Borland Australia on (02) 911 1000 or fax (02) 911 1011.

## Multimedia madness at K Mart

Unexpected demand for Packard Bell Multimedia PC

**T**he launch last month of Packard Bell multimedia enabled PCs through K Mart stores has been an overwhelming success, according to K Mart buyer Rob Lawrie. What surprised K Mart, according to Lawrie, was the take up rate of the CD-ROM model, rather than the base model. "While we did expect that both would sell, it was totally unexpected that the CD-ROM model should outsell the base model on a ratio of 6:4."

"With a \$3000 item and a \$2000 item, you'd expect that in a volume sales retail store such as K Mart, the lower price point would outsell the more expensive alternative."

K Mart, he says is a place where people typically come when they know what they want and are looking for a good price rather than to have the products explained. "PC resellers are there to sell up, and spend time explaining," he said. "K Mart staff don't have the time to do that."

The success of the project is an indicator of the market's maturity, that so many customers feel capable of making those choices, rather than being hand held at point of sale.

Also, it is a testimony to K Mart's reputation. Service and hot-line support for the PCs is carried out by Packard Bell, and Lawrie says that being able to guarantee expert assistance is an important part of the equation.

According to Lawrie, feedback from the Packard Bell enquiries line has indicated that many of the people have very basic questions, and are obviously first-time users very unfamiliar with computers. Hardly likely to buy from a superstore? Apparently not. "People think K Mart and equate it with reliability — if there's anything they need, they believe K Mart will not leave them high and dry. That's the one advantage we have that we absolutely underestimated," Lawrie said.



# New & Improved

## NEWS OF ANNOUNCED PRODUCTS AND UPGRADES

### NEW Sharp's new personal digital assistant arrives

Sharp, the first licensee of Apple's new Newton technology, is now shipping its PI-7000 Expert Pad, a Personal Digital Assistant which uses pen-based technology to translate handwriting into type characters.

As well as offering traditional organiser functions including Personal Information Management (PIM), the Expert Pad uses infra-red wireless networking technology to allow information to be transmitted to other Expert Pads. Data can also be sent and received to both Macintosh and PC platforms and users can send fax messages, print hard copy and access public electronic mail services.

Under development for the Expert Pad are application development tools. "There will be a great deal of third-party development for the Expert Pad. We believe the Newton technology will become an industry standard

for Personal Digital Assistants," states Veronica Sagovac from Sharp.

The Expert Pad has a 20MHz 32-bit RISC processor with 640K RAM, 4M ROM and stylus. The unit weighs 440g. The Expert Pad costs \$1499 and is available from major retail chain stores and Sharp dealers. For further information, contact Sharp on (02) 831 9111.

### NEW Kingston introduces EISA network adaptors

Based on the PLX EISA 9032 LAN controller chip and using Direct Bus Mastering, Kingston Technology has introduced two new 32-bit EISA Ethernet network interface cards. Available as a dual interface configuration card supporting 10Base2 and 10BaseT, or a three-in-one configuration supporting 10Base2, 10BaseT and 10Base5, the cards are fully compatible with popular operating environments including NetWare, NetWare

Lite, Microsoft LAN Manager and Windows for Workgroups.

Distributed in Australia by Australasian Memory, the dual interface EtherX EISA card costs \$610; the three-in-one EtherX EISA card, \$690. For more information, contact Australasian Memory on (02) 899 5637.

### IMPROVED Jump to 486 power with Hypertec PS/2 upgrade board

Following the release of the 486SX/25 processor upgrade board, Hypertec has announced a 486SX/33 upgrade board designed for the IBM PS/2 Model 70 and 80.

The Hyperace 486SX/33 provides a performance boost similar to 486DX upgrades previously released by Hypertec. However, the Hyperace 486SX/33 does not include an integrated maths coprocessor. According to Katherine Doric from Hypertec, "The Hyperace 486SX/33 is ideal for applications that require processor and graphics power, but that are not maths-intensive." The Hyperace 486SX/33 is priced at \$1200. Contact Hypertec on (02) 805 0111.

### NEW NCR's local bus 486 upgrade option

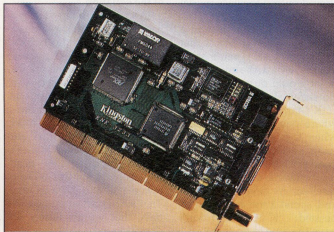
NCR has introduced a local bus version of the NCR Sys-

tem 3230. The NCR 3230 Local Bus provides an entry-level AT-bus computer with Intel 486 performance and VESA industry standard graphics. Upgradable to the range of Intel 486 processors to 66MHz, the system is also equipped with a ZIF (Zero Insertion Force) socket for an easy upgrade to Pentium technology. Targetted against the entry-level computers from IBM, Compaq and Dell, a 486SX 25MHz system with 4M RAM, 120M hard disk, 3.5in floppy drive, keyboard, Microsoft mouse and DOS 6.0 and Windows preloaded will cost \$2609. Contact NCR Australia on (02) 964 8111.



### NEW NEC expands Versa notebook range and cuts prices

The NEC UltraLite Versa range has been boosted with the introduction of the UltraLite Versa 33 monochrome notebook and the UltraLite Versa 33C colour notebook, both



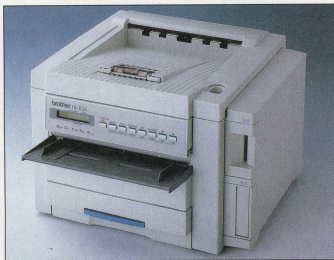


equipped with a 33MHz i486SL processor. Like the other notebook computers in the series, these units offer five modular upgrade paths — the display, memory, hard disk, processor and pen computing. Two PCMCIA Type II slot and one PCMCIA Type III slot are also included. The Versa 33 with a 120M hard disk and 4M RAM costs \$5626. A similar configured Versa 33C costs \$7946.

At the same time, NEC has announced price cuts of up to six per cent on the UltraLite Versa 25MHz models. For further information contact NEC Information Systems Australia on (02) 930 2000.

#### NEW HP's low-priced PC family unwrapped

Hewlett-Packard Australia has introduced a new line of low-priced PCs that feature a small footprint and energy-efficient operation. The new Vectra 486VL family are ISA bus machines that are available in three models: the 486SX/25, 486DX/33 and 486DX2/66. The systems come standard with 120M up to 240M hard disks, 3.5in floppy, 4M of RAM expandable to 32M, and optional 128K cache. Prices start at around \$2650, which includes a three-year warranty. Contact HP's Customer Information Centre on 13 1347.



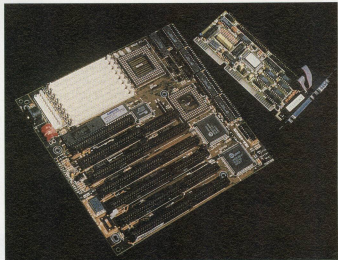
#### IMPROVED Wang Express kits boost old PCs to 486 level

Can't afford a new computer or just sentimental and don't want to get rid of that old workhorse? Wang Express may have the solution. Wang Express is offering a series of kits to upgrade 8088 or higher compatibles to 386DX or 486 performance. Starting from \$915, the kits come with a 12-month warranty and are fully installed by Wang engineers. Contact Wang Express on (02) 898 6111.

#### NEW Brother's HP 4 PostScript laser

Brother is claiming it is on the verge of releasing a new standard in office laser printing with the release of the HL-10h laser printer.

The Brother HL-10h provides HP LaserJet 4, PostScript, Brother, Epson, IBM and Diablo emulations as standard and uses the EP-S toner cartridge. It is powered by a 20MHz 32-bit microprocessor, prints at 10ppm and has 600dpi resolution. The printer comes with 2M RAM as standard, which is upgradable to 34M with the addition of standard SIMMs. Priced at \$3299, the HL-10h also features automatic emulation and interface switching as well as

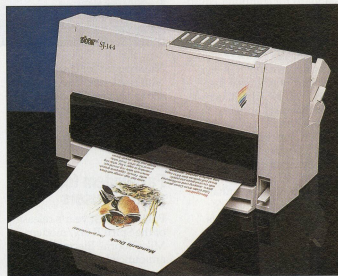


automatic paper sensing. It can be upgraded to be suitable as a network laser printer. Contact Brother Industries on (02) 887 4344.

#### NEW Star unveils new heat fusion printer

Targeted at the colour printing market, Star Micronics has launched the SJ-144

ages. Heat fusion technology does overcome some of the annoying problems associated with inkjet printers such as 'spidering'. According to Max Fredericks of Star Micronics, "We see inkjet technology as an evolutionary mistake in the development of printer technology." The SJ-144 costs \$1495. For further information contact Star Micronics on (02) 748



printer. Using heat fusion transfer technology, where ink is 'burnt' off a ribbon onto the printed surface, the SJ-144 can print on virtually any type of surface including recycled paper and film transparency material. With a resolution of 360 by 360dpi, the printer offers colour manipulation, true black text printing and clear, sharp im-

4300. A review of the SJ-144 will appear in the next issue of APC First Looks section.

#### IMPROVED Printer upgrade kit does colour photo prints

Practical Peripherals has introduced a new Photo-Realis-

tic Upgrade Kit for its \$2300 Primera Colour Printer, which combines dye sublimation and thermal transfer technology to allow users to produce high-quality photographic prints at a fraction of the cost of standard dye-sublimation printers.

The (\$895 approx) Photo-Realistic Upgrade Kit is easy to install and use, say company officials, and besides requiring the Primera Colour Printer, suits users with IBM PC-compatibles running Windows 3.1. For more details, contact PPC on (07) 839 1142 or fax (07) 8839 1145.

## NEW Zenith's in with energy-efficient monitor

Zenith has released in Australia its environmentally friendly ZCM-1540 SuperVGA multisync colour monitor, designed to meet the US Environmental Protection Agency's 'Energy Star' standard for computer equipment that is more energy-efficient. The monitor will automatically switch to lower levels of power consumption when not in use, and after one hour of inactivity, will switch into a rest state that consumes less than eight watts. According to Graham Jones from Zenith Data in Sydney, "Products like the environmentally-friendly ZCM-1540 save customers money and enhance the computer industry's price-performance efforts." The ZCM-1540 is a 15in monitor with a flicker free display. It has a resolution of 1024 by 768 pixels and costs \$1295. Contact Zenith Data on (02) 417 1522.

## NEW Radius colour monitor features pivot display

Radius has introduced a new 15in colour monitor, the PrecisionColor Pivot. Distributed in Australia by Tech

Pacific, the PrecisionColor Pivot offers either colour portrait or landscape display for PC or Macintosh applications. This feature will allow the user to work on a word processing document in the normal portrait position, and pivot the display to the horizontal position to work on spreadsheets and wider applications while automatically redrawing the screen to the new orientation.

The PrecisionColor Pivot is priced at \$2399 for the PC. It



offers up 16.7 million colours with resolutions from 640 by 480 to 1024 by 768 and satisfies the MPR II ergonomic standards. Contact Tech Pacific on (02) 697 8666.

## NEW Fax modem for portable users

Following last year's release of the Spirit II fax/modem, Mike Boorne Electronics has announced a pocket-sized version of the product, the Spirit Pocket. A battery-driven modem with a built-in 'sleep' function to prolong battery life, the unit is small enough to fit in the hand. Austel approved, it performs to V.32bis, V.22bis, V.22 and Bell 212A standards and has a V.42bis and MNP 5 data compression facility. The modem interfaces to the computer via a RS-232 serial port.

The Spirit Pocket also fea-



tures Class 2 Group 3 fax capabilities.

It comes bundled with Quicklink II communications software and costs \$749. For further information, contact Mike Boorne Electronics on (02) 416 9168.

## NEW Dextra's fast DR-600 scanner

Dextra Computer Products has added a new scanner to its range of sheet-fed models for the PC

platform. The DextraReader DR-600 is capable of scanning a full page in less than eight seconds. It provides 256 greyscale scanning at 600dpi resolution.

The DextraReader DR-600 package includes TypeReader OCR software and iPhoto Plus image processing software and has a recom-

mended retail price of \$1760. There is a special limited introductory price of \$1500. For more details, contact Dextra Computer Products (Aust) on (08) 235 2388.

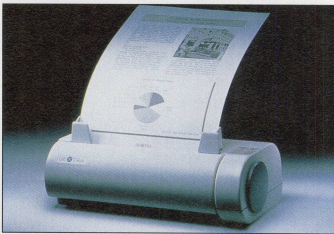
## NEW Sharp announces high-end colour scanner

Sharp has boosted its range of colour scanners with the release of the JX-610 A3 flatbed colour scanner. With a resolution of 600dpi, selectable in increments from 30 to 600dpi, the resolution can be boosted to 1200dpi through interpolation. The unit supports 24-bit colour and can also scan greyscale and black and white images. All scanning is done in a single pass.

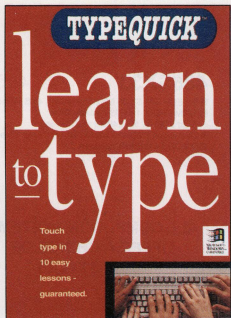
The scanner has both GPIB and SCSI-2 interfaces. ImageIn software for the GPIB interface and ImageIn software for the SCSI interface are supplied. The JX-610 is priced at \$17,995. For further details, contact Sharp on (02) 831 9111.

## IMPROVED Soft As It Gets boosts its programmer's text editor

Australian Software developer, Soft As It Gets,







has announced that the latest release of its programmer's text editor is now available. Recently shown overseas at CeBit in Germany and Spring Comdex and Software Development in the US, ED for Windows Version 2.0 enhancements include colour syntax highlighting, user defined word lists and visual comparison of files with difference highlighting. It provides extended language support for major languages including Assembler, C/C++, Clipper, Cobol, Fortran, FoxPro, Paradox, Pascal and SQL.

ED for Windows is priced at \$299. There is also a version for DOS which costs \$185. A special bundle for both products is available for \$390. For further information, contact Soft As It Gets on (03) 523 0577.

### IMPROVED Central Point Anti-Virus 2.0 is expert in detecting viruses

Central Point Software has added an expert system to its \$195 DOS-based Central Point Anti-Virus 2.0 (CPAV) for detecting unknown viruses. The Virus Analyser compares files it analyses

against what it knows about viral code characteristics to make a positive ID. No prior data about files in uninfected states is necessary. CPAV now detects more than 2000 known viruses, and scans compressed disk drives as well as files compressed in PKZip, PKLite, LZEXE, and ARJ formats. Central Point is also shipping Version 1.1 of

CPAV for NetWare with increased performance and more capabilities. For details, call Central Point Software on (02) 410 9801.

### IMPROVED TypeQuick Version 7.0 for Windows users

Australian software developer TypeQuick has released its first Windows version of its successful DOS keyboard training package. TypeQuick for Windows makes use of the graphics Windows environment by including animated hands to show users the correct finger movements for striking keys,

reports with pie graphics and bar charts to show learning progress, and graphics detailing correct posture at the keyboard. The package also features improved skill retention techniques to accelerate learning.

According to company officials, TypeQuick for Windows adds the company's DOS and Mac offerings, which hold around 75 per cent of the local corporate and tertiary education market and are exported internationally to countries such as Japan. TypeQuick for Windows costs \$99 for a standalone version; site licenses are available. For more details, contact the company on (02) 498 7433.

### IMPROVED MapInfo package bungles Australian Bureau of Statistics data

MapInfo Australia and the Australian Bureau of Statistics have put together a package that combines up-to-date demographic information that runs under MapInfo software for PCs. The package includes MapInfo software and CDATA91 CD-ROM resident data that allows users to conduct a complete analysis of 1991 census data. Users can display, analyse,

manipulate and print census data combined with census boundaries and topographic information such as roads, rivers and railway lines. CDATA91 and MapInfo is available in Windows and Mac versions, while a Unix version will be ready later this year.

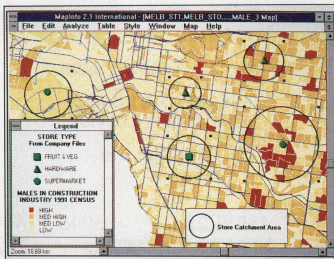
A version of the CD-ROM disk for the whole of Australia contains 640M of census, boundary and topographic data in MapInfo format and costs \$10,500. Versions of one-state only cost from \$4500 up to \$5500. Contact Ann-Marie Flanagan at Peripheral Systems on (02) 437 6255 or fax (02) 439 1773, or call Melbourne office on (03) 428 6747, fax (03) 428 6962.

### IMPROVED Central Point Software updates backup software

Central Point Software has announced new upgrades to its backup software for both the DOS and Windows platforms. Although designed for different operating systems, Central Point Backup Version 8.0 for DOS and Central Point Backup Version 2.0 for Windows offer identical features. Enhancements to the software include SCSI tape drive support, multi-level data encryption, tape drive utilities and a retry option for busy files. More than 1300 viruses can now be detected by the software before backup.

The software will also backup NetWare bindery and trustee information to a SCSI tape drive.

The recommended retail price of either product is \$190. Upgrades from previous standalone Central Point Backup versions cost \$55. Central Point are also offering users of other backup programs a cross upgrade price of \$99. For further details call Central Point Software on (02) 410 9801.





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<b>Trident Graphics 512K</b> 79	- Ports: 2x Ser, Par Ptr, Game	- Ports: 2x Ser, Par Ptr, Game
<b>Tystar SVGA 14" Monitor</b> 460	- IDE Hard Disk controller	- IDE Hard Disk controller
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- 1.44Mb 3.5" Teac FDD	- 1.44Mb 3.5" Teac FDD	- 1.44Mb 3.5" Teac FDD
- Ports: 2x Ser, Par Ptr, Game	- Ports: 2x Ser, Par Ptr, Game	- Ports: 2x Ser, Par Ptr, Game
<b>Additional 4Mb Ram</b> 496	<b>Additional 12Mb Ram</b> 1257	<b>2x Adaptec 1742 Elsa Hdc</b> 1998
<b>Ultrastar Vesa/SCSI Cont.</b> 598	<b>Ultrastar Vesa/SCSI Cont.</b> 598	<b>101Keyboard, Tacitile</b> 49
<b>Fujitsu 330Mb Hdd, F/Scsi</b> 790	<b>Fujitsu 520Mb Hdd, F/Scsi</b> 1460	<b>Trident Svga 512K</b> 79
<b>101Keyboard, Tacitile</b> 49	<b>101Keyboard, Tacitile</b> 49	<b>2x Fujitsu 1.7Gb Hdd</b> 7334
<b>Trident Graphics 512K</b> 79	<b>Paradise Svga Accelerator</b> 198	<b>Philips VGA 14" Monitor</b> 255
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Hdd/Fdc: w/BIOS, Intelligent cont.	UltraStar 14F Hdd/Fdc F/Scsi	UltraStar 34F Vesa/SCSI
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- Minitower, Desktop or Slimline	- Minitower, Desktop or Slimline
- i80486-DX 50MHz processor	- i80486-DX 66MHz processor
- 256K processor Cache	- 256K processor Cache
- 4Mb Ram, Max 64Mb	- 4Mb Ram, Max 64Mb
- 2x Vesa32bit, 6x Isa 16bit slots	- 2x Vesa32bit, 6x Isa 16bit slots
- 1.44Mb 3.5" Teac FDD	- 1.44Mb 3.5" Teac FDD
- Ports: 2x Ser, Par Ptr, Game	- Ports: 2x Ser, Par Ptr, Game
<b>Vesa-ide HDC/FDC Contr.</b> 126	<b>Vesa-ide HDC/FDC Contr.</b> 126
<b>Additional 4Mb Ram (8M)</b> 496	<b>Additional 12Mb (16M)</b> 1176
<b>Honeywell 101Keyboard</b> 99	<b>Honeywell 101Keyboard</b> 99
<b>Diamond Vesa Stealth 1Mb</b> 378	<b>Diamond Vesa Stealth 1Mb</b> 378
<b>W/Digital 212Mb Hdd, 15ms</b> 429	<b>W/Digital340Mb Hdd, 11m</b> 698
<b>Philips 17" Monitor, 31</b> 1550	<b>Philips 17" Monitor, 31</b> 1550
<b>MS-Dos 6.0</b> 85	<b>MS-Dos 6.0</b> 85
<b>Hi-Res mouse</b> 23	<b>Hi-Res mouse</b> 23
<b>\$4461ex</b> \$5174	<b>\$5265ex</b> \$6093

### Hardware Options

Hard Disks	Hard Disks
<b>Call for advice on Drives</b>	<b>Fujitsu</b>
<b>IDE - 2 Year Warranty</b>	<b>SCSI - 5 Year Warranty</b>
Conner 84Mb, <17ms	Fujitsu 330Mb, 12ms, F/Scsi 790
Conner 120Mb, <19ms	Fujitsu 520Mb, 12ms, F/Scsi 1460
Conner 170Mb, 17ms	Fujitsu 1.1Gb, 10ms 2185
Conner 250Mb, 14ms	Fujitsu 2.55Gb, 11ms 4283
Conner 340Mb, 12ms	<b>Colour Monitors</b>
Conner 540Mb, 12ms	Tystar 17" 1024x768 28 I 460
Western Digital 170Mb, 13ms	Acer 33D 14" 1024x768 28 I 519
Western Digital 212Mb, 15ms	Mitac 14" 1024x768 28 NI LE 549
Western Digital 250Mb, 15ms	Mitac 15" 1280x1024 28 NI LE855
Western Digital 340Mb, 11ms	Sony 17" 1024x768 25 NI 2392
Western Digital 424Mb, 11ms	Philips 14" 1024x768 NI.28 779
<b>SCSI - 2 Year Warranty</b>	Philips 17" 1024x768 NI.31 1550
Conner 170Mb, 17ms Scsi	Philips 17" 1024x768 NI.26 2190
Conner 212Mb, 12ms Scsi	Philips 20" 1280x1024 NI LE 2490
Conner 360Mb, 12ms Scsi	NEC Monitors call for best prices....
Conner 540Mb, 12ms Scsi	
Conner 1.37Gb, 10ms Scsi	
<b>IDE - 5 Year Warranty</b>	<b>RAM</b>
Fujitsu 330Mb, 12ms	1Mb Simms 70nsec Jap/Usa 124
Fujitsu 520Mb, 12ms	4Mb Simms 70nsec Jap/Usa 419

See Warranty Prev. Page. RAM prices subject to change

### Windows?

Add-on cost for above Harris systems:

Windows 3.1	\$85
Windows-F-Worksgroups	\$119

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## Software

### Word Processing

Microsoft Word - Dos	455
MS Word-For-Windows	489
Anti-Pro	528
Word Perfect 5.1 - Dos	419
Word Perfect 5.2 - Windows	419

### Spreadsheets

Lotus 123 ver 2.4 - Dos	525
Lotus 123 ver 3.4 - Dos	575
Lotus 123 ver4.0 - Win	535
Lotus 123 ver 4.0 - Win	498
Excel 4.0 F Windows	499

### CAD Systems

We have 8 years experience supplying systems, plotters & digitisers specifically for CAD and DTP. Phone to discuss your hardware requirements and we will recommend you to the best Autocad & MicroStation suppliers.

### Presentation

Lotus Freelance-For-Win	499
Microsoft Powerpoint	499
Harvard Graphics - Dos	555
Harvard Graphics F Win	539
Persuasion F Win	499

### Integrated

Lotus SmartSuite	780
Microsoft Office	780
Microsoft Office Pro - Inc. Access	844
Microsoft Works - DOS	167
Microsoft Works-F-Windows	199
Lotus Works	199

### Networking

We can supply Microsoft LAN Managers servers, workstations and entire networks...

Microsoft LAN Manager 2.2 Serv Pck	2551
Microsoft LAN Manager 2.2 Lic. Pck	96
Novell Netware 2.2, 5 user	940
Novell Netware 2.2, 10 user	2095
Novell Netware 2.2, 50 user	4196
Novell Netware 3.11, 5 user	1149
Novell Netware 3.11, 10 user	2620
Novell Netware 3.11, 50 user	5246
Novell Netware 3.11, 100 user	7347

Also phone for **NETWORK UPGRADES**

### Graphics

Corel Draw ver 3.0 w CD	299
Corel Draw ver 4.0 w CD's	595
Aldus IntelliDraw	240
MicroGrafx Designer	592
TurboCAD V3 for Dos/V1 for Win	199
TurboCAD Pro for Windows	275

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### Desktop Publishing

Adobe PhotoShop for Windows	925
MicroGrafx Picture Publisher	574
Pagemaker 5.0	1090
Microsoft Publisher f win	179

### Utilities

Norton Utilities V7.0	199
Norton Desktop Win or DOS	199
PC Tools V8.0 Win or Dos	212
QEMM 386 V7	99
Stacker disk compression	147
SuperStor Pro disk compression	179
Xtree Gold	168
Xtree for Windows V1.5	99

### System Software

Dos 6.0 Upgrade	119
OS/2 ver 2.0	213
Windows 3.1	149
Windows for Workgroups	199

### Network Hardware

<b>ADAPTERS</b>	
W/D Ethercard 8bit, coax	221
W/D Ethercard 16bit, coax	229
SMC Ethercard 16bit, 10-T	217
Intel EtherExpress 16bit coax	218
Intel EtherExpress 16b, 5 pck	1086
3Com Etherlink II 8 bit coax	344
3Com Etherlink III 16 bit coax	249
3Com Etherlink III 16 bit 10-T	249
D-Link PCMCIA-2 Ether Adap, coax	496
D-Link PCMCIA-2 Ether Adap, 10-T	496
<b>10BASE-T HUBS/Concentrators</b>	
SMC 8+1 ports	787
SMC 12+2 port s	1693
Intel 12 port f Netware 3.11	1024

### Foreign Languages

Ezi French I Win	90
Ezi Italian I Win	90
Ezi Japanese I Win	90

### Misc. Software

ABC Flowcharter for Win	499
ACCPAC Simply Accounting I Win	187
Aldus Freehand	695
ACT for Windows	598
Adobe type on call CD-ROM	110
Adobe type manager I Win	139
Adobe 22 plus font pack	291
After Dark Star Trek scr saver I Win	78
Bitstream Facelift I Win	135
Bitstream Facelift I W.Perf.	135
Borland Turbo C++ DOS	137
Borland Turbo C++ Win	229
Borland Office	785

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Authorised **NEC** Dealer  
Authorised **Netcomm** Dealer  
Authorised **Novell** Dealer  
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### Misc. Software

Borland Turbo Pascal Dos	214
Borland Turbo Pascal Win	268
Carbon Copy Plus	248
Carbon Copy I Win	248
Claris Works for Dos	198
Close-up Cust & Supp	242
ClickArt - Various subjects	88
Crosstalk Mk 4	247
Crosstalk I Win	223

Software all latest versions, if not, we'll replace it! All obtained via Australian distributors - so you can obtain support and upgrades.

DBase 4 V2.0

DAC Easy Accounting	833
Desqview 386 inc QEMM	360
Fastlynx PC - PC Transfer	241
Foxpro V2.5 Dos database	196
Foxpro-F-Windows V2.5	576
Grammatik - Dos	172
Grammatik - Win	188
Idea Fisher	253
ISYS hypertext search Dos	424
ISYS hypertext search Win	424
Laplink file transfer V5.0	190
Lotus for OS/2	529
Lotus Organizer-F-Win	155
Lotus Improv	165
Microsoft Excel 1.1	555
Microsoft Excel I Win	595
Microsoft Flight simulator	74
Sydney IFR Project for Flight Sim	59
Microsoft Money I Win	760
Microsoft Office I Win	740
Microsoft Project I Win	499
Microsoft Projectpoint Pres.	95
Microsoft True Type 44 fonts	165
Norton Anti-Virus	146
OmniPage OCR Protes.	271
Org Chart I Win	860
Paradox-F-Win (special)	230
Paradox, Dos	169
PC Anywhere I Win Host & Remote	295
Printcase spooler I Win	398
Print-it, plot tr Sware for printers	93
Q & A Database	199
TypeQuick	
Winfax Pro fax software	



### Compilers

Microsoft C++ V7.0 w SDK	555
Microsoft Cobol compiler	998
Microsoft Fortran compiler	517
Microsoft Pascal compiler	411
Microsoft Quick basic	135
Microsoft Visual Basic 2.0 Win	245
Microsoft Visual Basic Pro Win	565

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We typeset our own artwork using PageMaker. Photo ready output is then produced in-house on our **LASERMASTER UNITY 1200XL TYPESETTER**

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<b>HAND SCANNERS</b>	
Logitech Scanman 256	335
Logitech SMan 256 w OCR	475
Logitech SMan Colour	781
Caere Typist w OCR	680
<b>DRAG THROUGH SCANNERS A4</b>	
ScanPlus 300, A4, 300 dpi B & W	583
ScanPlus 600, A4, 600 dpi 256 G/S	685
ScanPlus 6000, A4, 600 dpi Colour	950
<b>FLATBED SCANNERS A4</b>	
AVR 3000 256 grey sc 800dpi w I/F	1870
AVR 8800 24bit colour, 800dpi	2550
Picture Publisher for AVR	395
TypeReader OCR for AVR	595
<b>CAMERAS</b>	
Logitech fotoman+, B/W (New)	990
Dycam Hi-Res Professional	1558

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**FINANCE** (subject to approval)  
There are several options for finance available such as **Capital Lease** and **Operating Lease** for businesses, and the **HFS Household Card** for personal purchases which can provide from \$1000 to \$20,000 line of credit.  
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## Hardware & Notebooks

### Dot Matrix Printers

Epson LX-400 9pin 80col 180cps	277
<b>24 PIN PRINTERS</b>	
Epson LQ-100, 80col 200cps	459
Epson LQ-570, 80col 192cps	628
Epson LQ-1070 136col 252cps	857
Old ML-380, 80col 150cps	518
Old ML-590, 80col 360cps	833
Old ML-591, 136col 360cps	965
Fujitsu DL-1150, 110col, colour	540
Fujitsu DL-5800, 136col 504cps	2190

### Canon Bubblejets

Bubblejets..... all on display, 7 days!	
Canon Squirt BJ-10EX	499
Canon Squirt BJ-10SX	569
Canon Squirt BJ-20	599
Autosheet feeder for BJ-10/20	69
Canon BJ-200 A4 w autofeeder	695
Canon BJ-230 A3 w autofeeder	819
Canon BJ-300, 10" 300cps	1030
Autosheet feeder for BJ-300	163
Canon BJ-330, 15" 300cps	1175
Autosheet feeder for BJ-330	214
Canon BJ-800C Colour A4/A3	3890

### Sound & Video

SoundBlaster V2.0 M mono w speakers	162
SoundBlaster Pro 2 Stereo	290
Soundblaster 16 bit, Hi-Fi stereo	395
Soundblaster 16 bit, ASP Hi-Fi stereo	456
AudioMaster Pro 16 bit	424
M/Vison Pro Audio Spectrum Stereo16	354
M/Vison Parallel Port sound adapter	291
VideoBlaster (display video under Win)	779
Audio Master Studio Pro Stereo Spkrs	165

### Multi Media Kits

All Include CD-ROM Drive, Audio Card and a number of CD-ROM disks	
S/blastar Starter Pack, 2 CD's, int	735
S/blastar Starter Pack, 2 CD's, Ext	1180
S/blastar CD16bit Eduatin, 8 CD's, int	1167
S/blastar CD16bit Eduatin, 8 CD's, ext	1368
M/Vison CD-Fusion Kit 4 CD's	925
M/Vison CD-Fusion Kit double spin	1175
Sony Desktop Library, 6 CD's, int	996
Sony Desktop Library, 6 CD's, ext	1272

### CD-ROM Drives

Sony CDJ51A w/Uface	584
Sony CDJ51A Sosl-2, 280ms, int	834
Sony CDJ7811 Sosl-2, 280ms, Ext	1040
NEC Portable w/Uface	740
NEC CDR-74-1 Sosl, ext	949
NEC CDR-84-1 Sosl, int	849
NEC Sosl Wface kit 1/7484	219

**WARRANTY**  
All Harris Computer Systems are 2 years parts and labour RTB. All other items 1 year parts and labour unless otherwise stated.  
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### NOTEBOOKS & LAPTOPS

Toshiba		Canon	
<b>Toshiba - LCD Notebooks</b>		Come in and see the New Canon BN-22 Notebook. For the ultimate in portability and power, a 486 Notebook that has a bubblejet printer Built In!	
T1850, 386-SX25, 4M, 80M	2590	Canon 486-SLC25, 4M, 85MB & B/J	5362
T1900, 486-SX25, 4M, 120M	3390	Canon 486-SLC25, 4M, 180MB & B/J	6550
T1900, 486-SX20, 4M, 200M	3950		
T4400, 486-SX25, 2M, 120M	3790		
T4500, 486-SX20, 4M, 120M	3880		
T4500, 486-SX20, 4M, 200M	4475		
T4600, 486-SX3, 4M, 120M	5090		
T4600, 486-SX3, 4M, 200M	5690		
<b>Toshiba - Colour Notebooks</b>		<b>Mitac</b>	
T1850C, 386-SX25, 4M, 120M	3290	Mitac - LCD Notebooks	
T1900C, 486-SX20, 4M, 120M	4998	Mitac 386-SX33, 2M, 80M	2299
T1900C, 486-SX20, 4M, 200M	5835	Mitac 386-SX33, 4M, 80M	2490
T4400C, 486-SX25, 4M, 120M	5870	Mitac 486-SLC33, 4M, 80M	2990
T4500C, 486-SX20, 4M, 200M	6465	Mitac 486-SLC33, 4M, 120M	3190
T4600C, 486-SX3, 4M, 120M	7330	Mitac 486-SLC33, 4M, 200M	3490
		<b>Mitac Colour Notebooks</b>	
		Mitac 486-SX33, 4M, 120M	4490
		Mitac 486-SX33, 4M, 200M	4790

### CD-ROM Software

We now have a new range of CD-ROM titles with more appealing daily.

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### Laser Toners

The following toners suit the 4ppm and 8ppm Canon, Hewlett Packard, Star, Brother, Bezier, plus others; please call...

EPS Toner for 8ppm Lasers	172
EPL Toner for 4ppm Lasers	136

### HP DeskJets

HP DeskJet 500 Inkjet	639
HP DeskJet 500C Inkjet Colour	830
HP DeskJet 550C Inkjet Colour	1498

### Laser Printers

<b>New HP LaserJet 4L, 4ppm, 1M</b>	1269
Old 400, 4ppm, 512K	1357
Old 810, 8ppm, 1M	2253
DataProducts, 9ppm, 512K	1599
HP LaserJet IILP, 4ppm, 1M	1895
Canon LBP4+ 4ppm, 512K	1660
Canon LBP6-4, 8ppm, 2M, 2 Bin	2890

<b>POSTSCRIPT</b>	
HP LaserJet IILP+Pscript, 4ppm, 2M	2731
HP LaserJet 4, 8ppm, 2M, 2 Bin	2998
HP LaserJet 4M, 8ppm, 6M, 2 Bin	3998
DataProducts, 9ppm, 4M	3190
DataProducts A3, 15ppm, 4M	5690
Old 830, 8ppm, 2M	2599
Old 840, 8ppm, 2M	3529

See our lasers on display, 7 days

### Fax/Modems

Flashtalk Line Powered Modem	288
Avtek Internal, 1200/2400	289
Avtek CD930, V32, ext 9600/9600	642
Netcomm Pocket, 9600/2400	325
Spirit Pocket, 9600, V32	313
Netcomm AM1500, 9600/2400	699
Netcomm M4F, Class 2, 9600/2400	756
Netcomm M7F, Class 2, 9600/9600	1095
Avtek CD990, 1234+ MNP, ext	365
Avtek CD990, V32, MNP, ext	598
Netcomm PCMCIA, int 9600/2400	575
Netcomm ET, V32 123456SA	945
Netcomm Worldblazer	1663

### ORDERING

**HOW TO ORDER!**  
Many of our customers buy from us solely via phone or fax from within Sydney city or metro, NSW country or anywhere throughout Australia. Just call & enquire.  
**PHONE:** Call and give us your address, credit card details, or arrange to T/T into our account. We will advise when we can send out your goods.  
**FAX:** Your order to us with your address, phone no., details of your requirements and payment advice such as credit card, cheque in the mail, etc....  
Pay by cash, cheque, Mastercard, Visa, Bankcard, T/T bank transfer.

### Networking?

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# Price Watch

*With \$1000, you can add a bigger-capacity hard disk and a fax modem to your PC and still have change to spare. Our Price Watch team dug around for some of the best deals currently on the market.*

**M**ore and more, users are deciding that throwing the baby out with the bathwater is no longer a smart, or even viable prospect. Budget constraints are, more than ever, meaning that despite the wonderful array of new products with bigger hard drives and more bells and whistles, what you bought six, 12 or 18 months ago is going to have to last the distance.

At the same time, there's a growing requirement for more power and faster connectivity. But to go up and out doesn't necessarily mean you have to buy bigger and better.

Upgrading the hard disk of your PC can be an effective way of getting the extra space you need to run those extra applications. In fact, an upgrade and a portable fax modem can have the PC you were beginning to think was a little short of meeting your growing requirements looking much roomier and more comfortable.

Price Watch scoured the papers and hit the streets in search of PC overhaul bargains — to upgrade the average 486SX with a hard drive of 100 or 120M to 210 or 250M, and to put an external fax modem on as well.

While a lot of dealers we spoke to were simply happy to quote on what we asked for, a few made helpful suggestions. Command Communications reminded us that a Class 2 fax modem sends and receives at a rate of 9600bps, while a Class 1 will send at 9600 but receive at only 4800, which could make for some tedious file transferring.

Matt from Maestro estimated that a 1M file would take approximately an hour to transmit on an average 9600bps modem, while the same transfer would take closer to 10 minutes with the Maestro 144FME. There's a difference in price of around \$200, but if you're planning on doing a lot of data transfer, the difference in the cost of the higher capacity model will soon be surpassed by the cost of the phone bill — no matter which carrier you choose!

Hard drive upgrades options are many and varied. The most frequently mentioned brand was Western Digital; others popular with dealers were Seagate and Quantum.

In most cases there's the option to take the disk drive and run, or to pay a little extra to have it installed by the dealer. Sydney-based Synax charges by the hour, and will even come to your place to install the hard drive, and transfer all the files to the new drive, all for an extra fee, of course.

Many of the dealers suggested we keep our existing drive and squeeze the upgrade in as well, which is quite plausible unless you have a really slimline desktop case. It also means that instead of doubling the disk size, it's instantly trebled.

So, for close to \$1000 you can make that perfectly-good but maybe-a-little-squeezed PC into a dynamic computing and communications tool for the 90s. *as*



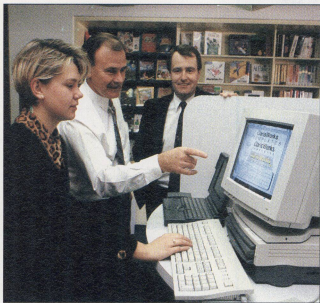
# ADD-ON UPGRADES

Provider	Phone	Hard disk upgrade	Price	Fax/Modem	Price
AVO Computers	(02) 959 3328	AVO 245M	\$488	Avo Internal 9600/2400	\$268
Accuma	(02) 906 3485	Maxtor 245M	\$430		
Auriga	(02) 415 2488			Banksia 2400 Data 9600 Fax	\$310
				Banksia MX6	\$850
PC Junction	(02) 415 1911	Quantum 245M	\$595		
		Western Digital 210M	\$411		
Micro Sales	(02) 391 0555	Seagate 245M	\$705		
Invotek Computer Systems	(03) 563 5556	Western Digital 255M	\$452		
		Seagate 245M	\$446		
		Quantum 240M	\$535		
Commence & Associates	(03) 614 3581	Western Digital 250M	\$565		
		Quantum 240M	\$637		
Synax	(02) 905 5977	Seagate 245M	\$619 + installation @ \$95/hr + \$60 travelling time		
Harris Technology	(02) 957 1142	Conner 250M	\$570	FlashTalk Line-Powered Modem	\$288
				Avtek Internal 1200/2400	\$289
		Maxtor 210M	\$652	Avtek CD930 V.32 ext- 9600/9600	\$642
				NetComm Pocket AM 1500 9600/2400	\$325
		Western Digital 212M	\$538	NetComm AM 1500 9600/2400	\$313
				Avtek CD890 1234 + MNP ext	\$395
Maestro	(06) 242 9755			Maestro 9600 XR	\$399
				Maestro 144 FME	\$599
Command Communication	(02) 743 1144			NetComm Auto Fax Modem	\$320
				Maestro External Fax Modem	\$399

# Integration: A Logical Solution

BY HELEN DANCER

**M**ore control, and the freedom to choose what they need — that's what people are buying these days, according to Robert Kay, managing director of Logical Solutions, one of Australia's most successful Apple resellers. His company has, over the last several months, changed its profile, becoming a purveyor of skills rather than simply products. "We sell ourselves on skills, then platform," he asserted. "IT must meet needs, and provide a comfortable working environment — that's the only way of helping users become more productive. Also, new pieces of technology must help people to work as they did before, and thus avoid the substantial costs in retraining."



*There are no toaster oven sales-staff here. Especially since Logical solutions wants to keep its clients abreast of technological developments and to supply and integrate products on an ongoing basis*

Having such a strong profile as an Apple reseller, the company caused industry eyebrows to be raised when, in May, it announced its intention to supply and support Compaq products along with its traditional Apple range. More recently, the company announced that Fujitsu had acquired a substantial share — money that Kay has allocated to invest in growing the company. Logical Solutions has seen rapid growth, with an estimated \$80 million in revenue recorded this year. Up until the buy-in, the company operated essentially on third-party trading finance, because the people who started the company up had a lot of good ideas rather than a lot of money, he says.

When Kay took the managing director's position last November, he acted on three of the company's imperatives for growth: the need to secure long-

range finance, to recognise and pursue the emerging emphasis on downsizing, and to take Logical Solutions into good strategic partnerships to enable it to offer cross-platform systems.

"The partnerships we have forged with Compaq and Fujitsu, as well as our strong relationship with Apple, have put Logical Solutions in a strong position as far as offering best-of-breed technologies along with our own wide skills base. Our continued success lies with being able to offer a range of superior products, as well as the skills to integrate disparate hardware on diverse platforms, and manage integration at an operating system, hardware platform or network level, and also provide knowledge on a wide range of generic products, popular applications, to implement exactly what the customer requires."

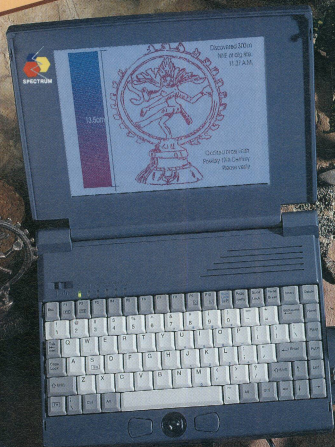
The approach has benefit to both the corporate and small business or single buyer. At the corporate level, the company's skill base and range of products allows it to offer another level of technology partnership — keeping the client abreast of technological developments, and supplying and integrating product on an ongoing basis. For small business or single users, Logical Solutions has retail outlets in Sydney, Melbourne, Brisbane and Canberra. These retail stores also provide the knowledge pool available to the higher end corporate customers, according to Kay. Talking to an IT-savvy sales person, rather than a toaster oven salesperson who has strayed across the floor is likely to deliver a more usable system, and often a better return on investment.

"The days of the model T Ford are over," said Kay. "Once, you could say, 'Look, it's a car, it only comes in black and it will get you from A to B'. No more. We must be able to provide the systems that people actually need, and are comfortable with, in mixed environments and in changing technological climates. And ultimately, what we sell, we have to stand behind — and we can firmly stand behind the technology partners we have chosen." ■



# YOUR SUCCESS DEPENDS ON WHERE & HOW FAST YOU RESPOND

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Fully Portable Cellular Data Connection



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No bigger than a business card, AXCELL establishes a clean link to the cellular network. Plug it in, and you're powered and ready for business.

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### 30 DAY MONEY-BACK \*GUARANTEE

We're so confident of AXCELL's remote access capabilities, we're offering a no-risk, 30 day money-back\* guarantee.

Put AXCELL to work for you today.

Call **008-818-687** ext. 127 and increase your chances of survival in today's highly competitive business environment.

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**(RRP - \$645.00 Inc. Tax)**

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Spectrum Cellular Corporation - Dept 10 - 2611 Cedar Springs Road - Dallas, TX 75201

# PC Super Market Buyer's Protection Scheme

## Buy With Confidence

**B**uying direct from magazine advertisers is becoming an increasingly popular way to purchase PC hardware and software. *PC Super Market* has been launched to provide a one-stop guide to the best products currently available at the best prices.

To protect our readers, we back all adverts appearing in *PC Super Market* with our 'Buyer's Protection Scheme'. The Scheme offers two great benefits:

1. The Payment Protection Plan — Where a supplier goes into liquidation after receiving your order and full payment, but before actually supplying the goods, we will reimburse to you the amount you have paid to the supplier in

respect of that particular order; provided your order has been registered with us.

2. The Problem Clinic — If you encounter any problem with a product purchased through the Scheme within 12 months of the product order being registered with us (see below), and the supplier won't put things right, we will liaise with the supplier on your behalf to try to sort the problem out. This benefit is non-transferable and applies to the original registered purchaser only.

The Scheme applies to all orders placed with suppliers in direct response to an advertisement in *PC Super Market*. To register a purchase with the Scheme, simply order goods from the supplier in

the normal way and then complete the *PC Super Market* Registration Form on Page 25. Give your personal details along with details of the purchase you wish to register. Post the form along with a self-addressed stamped envelope to us within seven days of ordering. The Scheme only protects orders placed within the cover month in which the advertisement for the specific product appeared (for example, the valid period for the September issue is until September 30).

### What protection do you get?

#### The Payment Protection Plan

ACP Publishing Pty Ltd limits its responsibility under the Payment Protection Plan to:

- (a) a maximum of \$10,000 total payments to a registered party in respect of each advertiser;
- (b) an aggregate maximum of \$100,000 total payments in respect of all claims by a registered party during any year commencing July 1.

#### The Problem Clinic

If you encounter problems with a product, within 12 months of registration with us, we ask that you first give the supplier the opportunity to put things right. If you fail to get satisfaction from the supplier, the Problem Clinic will liaise with the supplier to try and resolve your problem. We cannot, however, give product support relevant to specific products. If you need assistance with a delivery problem, before contacting us please allow 28 days from the date on which you place your order to allow advertisers to cope with fluctuations in demand.

#### Claiming under the Scheme

- (i) Before providing the benefits of the Scheme, we will require proof of full payment by you to the supplier.
- (ii) Payment under the Payment Protection Plan will only be made after other liable parties (such as insurance and credit card companies) have met their liability to you in full.
- (iii) Claims under the Payment Protection Plan must be made in writing in the prescribed form (available on request). Claims will only be met where the appropriate claims form is lodged with us within 30 days of the liquidation of the supplier. Claims forms must be sent or delivered to GPO Box 37, Sydney NSW 2001.
- (iv) Payment under the Payment Protection Plan will not be made if the claimant is found to have an association or relationship with the advertiser or its directors who are the subject of the claim.

#### Ambit of the Scheme

*PC Super Market's* Buyers Protection Scheme is available only to parties resident or carrying on business in Australia.

#### Recovery by ACP Publishing Pty Ltd

ACP Publishing Pty Ltd reserves the right to seek recovery from a liquidated supplier of any sums paid to you under the Payment Protection Plan. All we ask is that you give us your full co-operation, including executing any formal documentation required.

#### Before Buying

**1** Use the *PC Super Market* Buyer's Template on page 27 when ordering. This will ensure that both you and the supplier have all the information needed.

#### To Register

**1** Fill out the *PC Super Market* Buyer's Protection Screen Registration Form on page 25. Make sure to fill out all details including the page the advertisement appeared.

**2** Mail the completed Registration Form to *PC Super Market* together with a self-addressed envelope.

**3** On receipt of your Registration Form we will issue you a reference number for that purchase. This will be mailed to you. You should keep this on file and be ready to quote it in case of enquiry.

#### Conditions

**1** The order must be placed in direct response to an advertisement in *PC Super Market* only (i.e. not from brochures or other promotional material sent in response to an enquiry). The order must be placed not later than the end of the cover month in which the advertisement appeared (for example, before September 30 for this issue).

**2** Details of the order must be registered using the *PC Super Market* Buyer's Protection Scheme Registration Form on Page 25 not later than seven days after the order has been placed with the advertiser.

**3** The Buyer's Protection Scheme applies only to *PC Super Market* advertisements. Advertisements appearing in other areas of *Australian Personal Computer* are not covered.



In order to register your purchase under the Buyer's Protection Scheme, you must complete this coupon and return it to us no later than the end of the month of publication and also not later than 7 days after the placement of the order (ie: all coupons must be post-marked prior to September 30, 1993 for this issue).

## BUYER'S PROTECTION SCHEME REGISTRATION FORM

## SUPPLIER DETAILS

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Postcode \_\_\_\_\_  
Telephone \_\_\_\_\_  
Fax \_\_\_\_\_

**CUSTOMER DETAILS** Order Date \_\_\_\_\_

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Postcode \_\_\_\_\_  
Telephone \_\_\_\_\_  
Fax \_\_\_\_\_

These items were bought from an advertisement appearing in PC Super Market on page \_\_\_\_\_ of issue \_\_\_\_\_

[illegible]

## DELIVERY DETAILS

Method of delivery \_\_\_\_\_  
Date of despatch \_\_\_\_\_ Date of delivery \_\_\_\_\_  
Delivery address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Postcode \_\_\_\_\_

SUB TOTAL	
DELIVERY	
PACKAGING	
SALES TAX	
<b>GRAND TOTAL</b>	

**METHOD OF PAYMENT** Purchase Order . Cheque . Postal Order . Credit Card (Delete as applicable).[illegible]

FOR ACP PUBLISHING PTY LTD USE ONLY

**Please don't forget to send this coupon together with a self addressed envelope to:**

PC Super Market  
ACP Publishing Pty Ltd,  
GPO Box 37  
Sydney NSW 2001.

**REPLY** PC Super Market acknowledges receipt of your Buyer's Protection registration card. We have allocated the reference number [ ] to your purchase.

Please quote this reference number in all future correspondence.  
Thank you for buying through PC Super Market.

**Please note you will be required to produce this coupon as proof of registration.  
Please keep it in a safe place.**



## S E P T E M B E R 1 9 9 3

## PC Supermarket Buyers Questionnaire

PAGE 26 PCSM SEPTEMBER 1993

Make ordering computer equipment and software easier and safer by using the specially designed *PC Super Market* Buyer's Template. Simply fill in the details of your system and the goods you intend to purchase. Send the form to the supplier to get written confirmation of availability, pricing, compatibility with your PC system, delivery and returns arrangements. Don't forget to register your purchase under the ACP Publishing Pty Ltd Buyer's Protection Scheme. (See page 25)

## PCSM SEPTEMBER 1993 PAGE 27



## Quattro Pro 5 for Windows or DOS

- Interactive Tutor and Object Inspector lets you bypass the menu maze.
- Spreadsheet Notebook for the simple, clear organization of your spreadsheets.
- NEW! Data Modelling Desktop. Even swap rows and columns to view your work from several angles.
- Directly reads/writes all major spreadsheet file formats.
- On-Line Training and entire manual.
- Plus "Drag & Drop", 47 chart formats, 350 numerical functions and everything you expect from the best spreadsheet!

Incredible value! **\$195**

(Workgroup Edition: \$495)

**Best spreadsheet.  
Best price.**

600 TrueType Fonts	199	Save	\$66
ABC Flowcharter 2.0 for Windows	459	Save	\$175
Act! for Windows	410	NEW	
Adobe PhotoShop 2.5 Windows	895	NEW	
Aldus PageMaker 5.0	959	NEW	

**FREE  
DELIVERY  
TO ALL STATES\***

Arts & Letters for Windows	295	Save	\$455
AutoSketch for Windows	245	Save	\$54
Bitstream True Type Fonts II	55	NEW	
Borland C++ 3.1 & Frameworks	850	Save	\$335
<b>Borland Office</b>			<b>\$625*</b>

\*after \$150 rebate. Rebate valid for purchases from August 1 to September 30, 1993.

Carbon Copy 2.0 for Windows	189	NEW	
Chaos by Autodesk	89	NEW	
CheckIt 3.0 & Pro 1	199	Special	
Claris Works for Windows	149	NEW	
Complete World Atlas Windows/MAC	85	NEW	

**Corel Draw 3.0b & CD \$249**

**Corel Draw 4.0 & CD \$595**

CrossTalk 2.0 For Windows	179	Special	
DBase IV 2.0 DOS	825	Save	\$325
Dbase 2.0 DOS Compiler	560	NEW	
DBFast 2.0 for Windows	165	Special	
Designer 4.0 for Windows	459	NEW	
Designer 4.0 for Windows Xgrade	279	NEW	
Desqview 386 V2.6	129	NEW	

**FAST!  
SAME DAY  
DESPATCH**

EasyFlow 8.0 DOS	299	NEW	
FaceLift 2.0 for WordPerfect DOS	119	Save	\$36
Generic CADD 6.0	560	Save	\$135
Generic 3D 2.0	479	NEW	
Harvard Graphics 2.0 Windows		NEW	
Hijaak Pro For Windows	225	NEW	
HP New Wave 4.1 for Windows	185	Special	
InfoSelect 2.0 for Windows	195	Save	\$65
Instant Artist for DOS	129	Save	\$20
Instant Artist for Windows	165	Save	\$4
ISYS 3.0	465	Save	\$60
Just Write 2.0 for Windows	109	Save	\$20
Lantastic AI 5.0 DOS	119	NEW	
Lantastic AI 5.0 Windows	139	NEW	
Lantastic Licences, cards - Full Range		Please call	
LapLink PRO 5.0	179	Save	\$86
Laplink Pro V for Network 2.23.11	49	Special	
Lotus 1-2-3 V4.0 for Windows	499	NEW	
Lotus 1-2-3 V2.4 for DOS	545	Save	\$304
Lotus 1-2-3 V3.4 for DOS	629	Save	\$266
Lotus Licence Packs		Please call	
Lotus Freelance 2.0 Windows	540	NEW	
Lotus Improv 2.0 for Windows	175	Save	\$20
Lotus Organizer Windows	165	Save	\$84
Lotus SmartSuite 2.0 for Windows	829	NEW	
Lotus Symphony 3.0	725	NEW	
MS Access 1.0 for Windows	159	Special	
MS Access 1.1 for Windows	495	NEW	

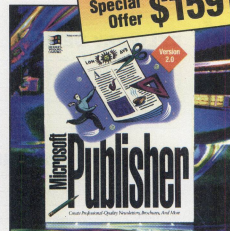
## COMPETITIVE PRICES

MS Access 1.1 Distribution Kit	495	NEW	
MS DOS 6.0 Upgrade (full product)	89	Save	\$10
MS DOS 6.0 Licence Packs		Please call	
MS Encarta Encyclopedia CD	449	NEW	

**MS Excel 4.0 \$415**

MS Excel 4.0, DOS 6.0 & Windows 3.1 bundle	\$569	NEW	
MS FoxPRO 2.5 Special Upgrade	189	NEW	
MS FoxPro 2.5 DOS or Windows	570	NEW	
MS FoxPro 2.5 Distribution Kit	570	NEW	
MS Golf for Windows	79	Save	\$30
MS MASM 6.1	235	NEW	
MS Money for Windows	59	Save	\$40
MS Mouse 2.0 Serial or BUS	115	NEW	
MS Mouse 2.0 & Windows 3.1	199	NEW	
MS Office 3.0 for Windows	775	Save	\$375
MS Office Professional-now with Access 1.1!	869	NEW	
MS Open EIS Pack	115	Save	\$34
MS Project 3.0 for Windows	795	Save	\$310
MS Publisher Design Pack	89	Save	\$10
MS Sound System Windows	325	NEW	
MS True Type Font Pack I, or II	95	Save	\$44
MS Visual Basic 3.0 Windows	239	NEW	
MA Visual Basic 3.0 Windows PRO	565	Save	\$261
MS Visual Basic for DOS	230	NEW	
MS Visual C++ for Windows	240	NEW	
MS Visual C PRO	575	NEW	

**Microsoft  
Publisher 2  
Special  
Offer \$159**



**RELIABLE**



MS Windows 3.1	139	Save	\$66
MS Windows 3.1 & True Type font pack II			\$159
MS Windows 3.1 NT	559		NEW
MS Windows 3.1 NT Upgrade	355		NEW
MS Workgroups 3.1 Addon	149	Save	\$26

## MS Word 2.0 Windows \$399

MS Word 2.0, DOS 6.0 & Windows 3.1 bundle	\$559		
MS Works 2.0 for Windows	199	Save	\$100
M.Y.O.B. 3.0 Windows or MAC	389	Save	\$100
M.Y.O.B. Best Books for Windows	189		NEW

### Novell NetWare FULL RANGE

Novell NetWare 4.0 10 User	3365	Save	\$1675
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Norton Backup 2.2 DOS/Windows	99		Special
Norton Commander 4.0	125		NEW
Norton Desktop 2.2 for Windows	165		Special
Norton PC Anywhere 4.5 H & R	199	Save	\$74
Norton PC Anywhere Windows	199		Special
OS/2 2.1 on CD full	199		NEW
OS/2 2.1 upgrade from DOS / OS/2	135		NEW
OS/2 2.1 upgrade on CD	109		NEW
Org Plus 6.0 Advanced	159		Special
Paradox for Windows	249	Save	\$925
PC Tools for Windows	189	Save	\$76
Procomm Plus for Windows	165	Save	\$90
Q & A 4.0	390	Save	\$209
Q & A Write for Windows	59		NEW
Gemm 7.0	115		NEW
Quattro Pro Windows or DOS	195	Last stock	
Quick Books for DOS	175	Save	\$54
QuickTax for Windows	59		NEW
Quicken 6.0 DOS & Tax Pack	85	Save	\$44
Quicken 2.0 Windows & Tax Pack	85		Special
Stacker 3.0 for DOS 5 & Windows 3.1	119	Save	\$146
SuperProject 3.0 for Windows	179		Special

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**Stacker 3.1**  
Rescue Edition  
For MS  
DOS 6.0 **\$89**

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**CITY SOFTWARE**

TypeQuick 7.0 Windows	89		NEW
WinFAX Pro 3.0	165	Save	\$60
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WordPerfect 5.2 Windows Licence	279	Save	\$151
WordPerfect 6.0 DOS	439		NEW
WordPerfect 6.0 DOS Upgrade	189		NEW
WordPerfect Multiple Licences			Please call
W.P. Presentations 2.0 Windows			NEW
WordPerfect Office 4.0	285		NEW
WordScan for Windows	479	Save	\$70
XTree GOLD 2.55 DOS	155	Save	\$55

### ACADEMIC VERSIONS:

Aldus PageMaker 5.0	399		NEW
Ami PRO 3.0 for Windows	175	Save	\$24
Borland C++ 3.1 & Frameworks	299	Save	\$96
Lotus 1-2-3 V4.0 for Windows	169		NEW
Lotus SmartSuite 2.0 Windows	279		NEW
MS Bookshelf '93 Edition	140		NEW
MS Cinemania CD	65		NEW
MS Dinosaurs on CD	59		NEW
MS Encarta on CD	270		NEW
MS Excel 4.0 Windows	199	Save	\$81
MS FoxPRO 2.5	225		NEW
MS Musical Instruments CD	65		NEW
MS Publisher 2.0 for Windows	115		NEW
MS Works 2.0 for Windows	130	Save	\$19
MS Word 2.0 for Windows	199	Save	\$81
MS Visual C++	105		NEW
M.Y.O.B. 3.0 Windows	95		NEW
Paradox for Windows (scaled down)	95		NEW
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WordPerfect 5.2 for Windows	189	Save	\$59
WordPerfect 6.0 DOS	189		NEW

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# "King Of The Hill"

"... the best choice for connecting laptop and notebook systems to a LAN."

"The RingPocket 4/16, Accton Technology's first Token-Ring adapter, deserves to be described in superlatives. This superb external adapter has the lowest price, the fastest speed, and the greatest flexibility among the 4Mb/16Mb parallel-port adapters we tested. The low price even makes the RingPocket an attractive alternative to an internal adapter..."



"... the best overall performance and reliability."

"The best overall price vs. performance consistently came from Accton adapters. Only the Accton (EtherPocket-CX) had the knack of surviving all assaults we could throw at it."

LAN Magazine  
March 1992



▲ EtherPocket-10T  
(EtherPocket-CX  
for coaxial)

▲ RingPocket 4/16

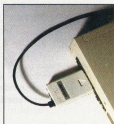
"Although Xircom created the pocket LAN adapter category, the king of the hill now is Accton technology..."  
PC Magazine

"... as much as 40% faster than Xircom's adapter..."

"Accton's EtherPocket (10BASE-T) performance on a Toshiba T1000LE laptop was about equal to and as much as 40% faster than Xircom's adapter..."

PC Week  
April 1, 1991

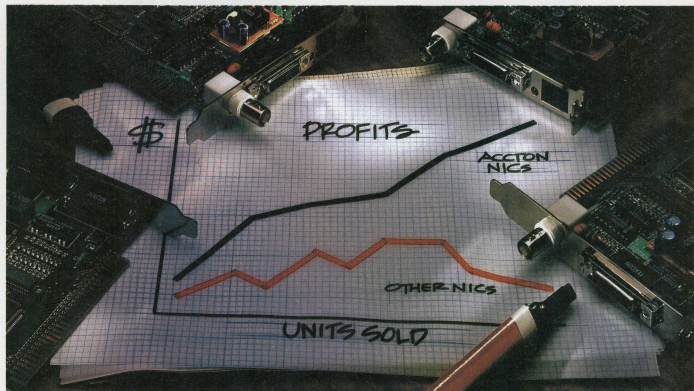
Our Laptop LAN Adapters have won rave reviews from the industry's most discerning critics. Easily connecting your laptop or notebook to a LAN, the EtherPocket and RingPocket are the most portable, most flexible, and most affordably priced parallel-port adapters on the market today. But don't just take our word for it. Read what **PC Magazine**, **PC Week**, and **LAN Magazine** have to say about Accton performance. Then consider which adapter should be your choice for laptop-to-LAN connectivity.



For more information on Accton's full line of Ethernet and Token-Ring networking products—including adapter cards, concentrators, repeaters, bridges, and transceivers—please call:

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TECHNOLOGY CORPORATION  
**07-257 1687**  
DEALER INQUIRIES WELCOME

# Get Out Of The Red. And Into The Black.



## Accton's Next-Generation NICs: 20% More For 20% Less.

### Accton Provides More For Less.

Accton's next generation Ethernet NICs give you more for less. More interrupts (8), more I/O addresses (256), and more Boot ROM address selections (32) than are provided by other adapters on the market. Furthermore, Accton's next generation adapters are software configurable, meaning no more fumbling with jumpers, and they're backed by a 2 years warranty.

What's more, to help resellers compete in today's aggressive market conditions—and despite all these advantages—Accton's suggested retail price is still very competitive.

### All Aboard Accton.

Accton's Ethernet combo cards (EtherCombo-32 and EtherCombo-16) support all three types of media.



More media options mean greater flexibility and lower inventory carrying costs.

### Software Configurable.

Accton NICs make installation easy. Simply run the free installation software, select the appropriate configuration options from the menu, and save the information to the adapter's on-board EEPROM. After set-up, checking the adapter is as simple as running the diagnostic program provided on the configuration diskette.

### Extensive Driver Support.

NetWare (ODI and IPX for Server and Workstation), NDIS per Microsoft/3COM specification, IBM Lan Server, DEC Pathworks, Wollongong Pathway Access, packet drivers for FTP TCP/IP, NCSA TCP/IP, IBM TCP/IP, SUN PC-NFS, UNIX Stream driver for SCO (ODT), Interactive UNIX V3.2, and Accton LanSoft.

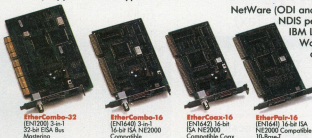
### Accton vs. Eagle.

Features	Accton EtherCombo-16 (EN1640)	Accton EtherCombo-16 (EN1641) EtherCombo-16 (EN1645)	Eagle NE2000 NE2000
Software Configurable	Yes	Yes	No (Use Jumper)
# of Interrupts	8	8	4
# of I/O Addresses	256	256	4
Integrated Ethernet/ISA Controller	Yes	Yes	No
Warranty	2 Years	2 Years	1 Year
NE2000/NE1000 Plug-Compatible	Yes	Yes	Yes

### Why Pay More For Less?

Want to get back in the black? Call CTM today to earn the high margins you deserve. Accton's next generation NICs are the adapters you can bank on.

For more information on Accton's complete line of connectivity products for Ethernet and Token Ring, including Laptop LAN Adapters, hubs, MAUs, bridges, and transceivers, call:



**CTM  
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Brisbane Australia  
Tel: (07) 257 1687 Fax: (07) 257 1689

**Tel: (07) 257 1687**

# Fontek

## SYSTEM III POS TERMINAL

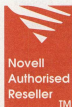


### "State of the art" Point of Sale Terminals.

*Dramatic productivity gains and an exciting contemporary look, with 386 power, ensures a competitive edge. Contact your nearest CTM dealer for more information.*

#### SYSTEM III Features:

- 386SX 33Mhz Performance.
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- Removable solid steel cash drawer with Credit card slot.
- Two colour docket printer.
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- Card reader equipped.(optional)
- 240 Volt powered.
- Expansion slots available on mother board.



### Dealer Enquiries Welcome

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*One Stop Total Solution Suppliers*



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# For purchases over \$2000 (ex tax)

SPECIFICATIONS	9-PIN DOT MATRIX										24-PIN DOT MATRIX					HI-SPEED		INK JET		LASER			
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* Specifications may change without notice																							
<b>DATA PROCESSING</b>																							
Draft Speed	500cps-1,100cps																		Print Speed				
	270cps-495cps																		10ppm				
	170cps-269cps																		6ppm				
<b>SPREADSHEETS</b>																							
Paper Width	136 Column																						
	80 Column																		A4 Size				
<b>PRE-PRINTED INVOICES</b>																							
Paper Feed Method	Tractor Unit																						
	Dual Sheet Feeder																						
	Single Sheet Feeder																						
	Advanced Paper Handling																						
<b>WORD PROCESSING</b>																							
Letter Quality Speed	180cps-250cps																		10ppm				
	120cps-190cps																		6ppm				
<b>PRESENTATIONS</b>																							
Number of Typefaces	Standard	3	3	3	3	3	8	12	12	3	12	12	3	8	3	3	11	11		16	41	38	27
	Optional																						
Colour																							
<b>GRAPHICS</b>																							
Memory Size	32-128kB																		6.5-10 MB				
	8-31 kB																		2.5-6 MB				
	3-7 kB																		512 kB-2 MB				
<b>DESKTOP PUBLISHING</b>																							
Print Quality	Presentation																						
	Letter																						
	Near Letter																						

- 2 Years Full Warranty ● Free Australia-wide Delivery#
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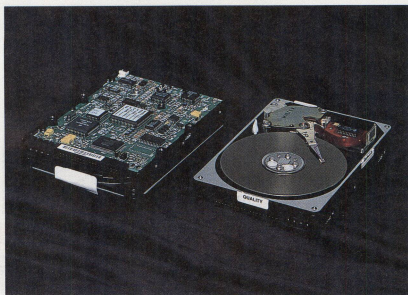


*One Stop  
Total Solution  
Suppliers*

CTM GROUP Presents:

Maxtor

# HARD DRIVES



Free  
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<b>MAXTOR AT-BUS HARD DISK DRIVES</b>						<b>MAXTOR AT-BUS HARD DISK DRIVES (Continued)</b>					
2585A	85	2.5	17.5mm	32	14.2	XT-8380S	360	5.25	3.25	256	14.5
25128A	128	2.5	17.5mm	32	14.2	XT-8760S	670	5.25	3.25	256	16.5
7040A	40	3.5	1	32	17	XT-8380SH	360	5.25	3.25	256	13.5
7080A	80	3.5	1	32	17	XT-8760SH	670	5.25	3.25	256	14.5
7060A	65	3.5	1	64	15	MXT540SL	540	3.5	1	256	8.5
7120A	120	3.5	1	64	15	MXT1240S	1.24	3.5	1.5	256	8.5
7213A	213	3.5	1	64	15	PO-12S	1.05	5.25	3.25	256	13
7245A	245	3.5	1	64	15	PI-17S	1.50	5.25	3.25	256	13
LXT213A	213	3.5	1.5	32	15	<b>MAXTOR ESDI HARD DISK DRIVES</b>					
LXT340A	340	3.5	1.5	32	15	XT-8380E	360	5.25	3.25		14.5
LXT535A	535	3.5	1.5	64	12	XT-8760E	676	5.25	3.25		16.5
7040S	40	3.5	1	32	17	XT-8380EH	360	5.25	3.25		13.5
7080S	85	3.5	1	32	17	XT-8760EH	676	5.25	3.25		14.0
7060S	65	3.5	1	64	15	<b>OPTICAL DISK DRIVES</b>					
7120S	124	3.5	1	64	15	RXT-800HS 393 or 786		5.25	1.5		108
7213S	213	3.5	1	64	15	RXT-HB Max. 15.6 GB		5.25	3.25		108
7245S	245	3.5	1	64	15	TAHITI II 644 or 1GB		5.25	3.25		35
LXT213S	213	3.5	1.5	32	15						
LXT340S	340	3.5		32	13						
LXT535S	535	3.5	1.5	64	12						

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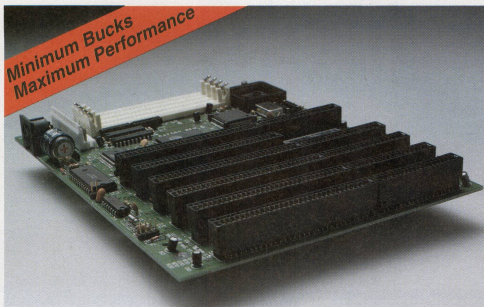
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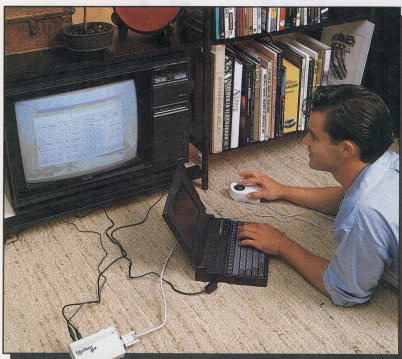


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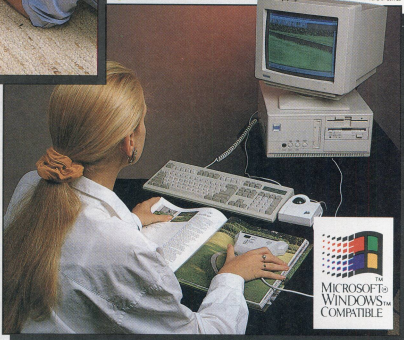
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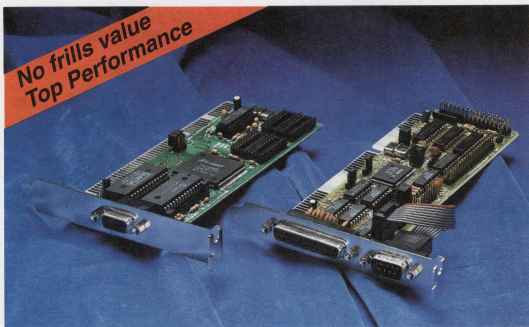
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COM 1, COM 2,  
COM 3, COM 4

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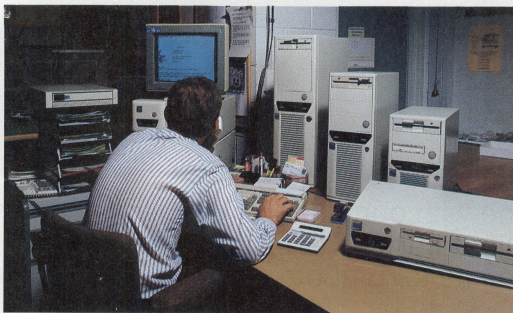


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17"

**3 YEAR WARRANTY**

## 28", 29", 33" Multi-media Monitors



33"

Model	Screen Size	Dot Pitch (mm)	Resolution	Hor Freq. (KHz)	Ver Freq. (Hz)	Low Radiation
DM-1435U	14"	0.28	1024 x 768	31.5/35.5	55-90	DM-1435UL
DM-1438	14"	0.28	800 x 600(N) 1024 x 768(I)	31.5/35.5 27.8	55-90	DM-1438L
DM-1448	14"	0.28	800 x 600(N) 1024 x 768(N)	31.5/35.5 48	55-90	DM-1448L
DM-1556	15"	0.28	1024 x 768(N)	31.56 Multisync	55-90	DM-1556L
DM-1764	17"	0.26/0.28	1280 x 1024(N)	30-64 Multisync	55-90	DM-1764L DBF
DM-2072	20"	0.31	1280 x 1024(N)	28-72 Multisync	55-90	DBF BNC & DSUB
DM-2135	21"	0.69	1024 x 768	31.5/35.5	55-90	
DM-2835	28"	0.82	1024 x 768	31.5/35.5	55-90	
DM-2935	29"	0.82	1024 x 768	31.5/35.5	55-90	
DM-3335	33"	0.87	1024 x 768	31.5/35.5	55-90	DBF

Power supply: 90-260 Vac universal (except DM-2135 & DM-2835)

UL FCC FTZ DHHS MPR-II

New South Wales Distributor: Alpine Pty Ltd  
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# Complete guide to buying direct

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Edited by – Margaret Coffey,  
Jeremy Torr  
and Richard Sharpe

## How to find your unique buying point

The best buyers know what they are looking for before they choose a retailer. The best retailers have the products you want, and unique selling points. Sensible buys depend on you making your own unique buying point and going for products and vendors accordingly.

Choosing a PC through the direct channel is not difficult as long as you stay in control of the buying process. Standard configurations offered by PC retailers will fit the requirements of 90 per cent of buyers. If you can't find exactly what you want, most direct retailers are only too happy to produce a customised machine, so don't be afraid to ask.

Follow three easy steps and

you should end up with exactly the right configuration of hardware:

1. Select the class of PC you want from the four basic classes: server, static single-user, portable, and local area network (LAN) workstation.

2. Decide what kind of configuration you need in your chosen class of PC.

3. Customise this basic configuration to your individual requirements.

As time goes on you can alter the basic configuration. You can add extra storage or input/output peripherals, or you can fill expansion slots in the basic system to accommodate new needs. To be certain you accurately rate one system or peripheral performance against another you will need to understand benchmarks; we cover them later in this chapter.

There is likely to be some overlap between the classes. Servers may be used by a single user, and larger single-user PCs can be used as servers. But, for clarity, make the basic choice with the help of the 'Choose your class' table.

assessment of your needs, you should have chosen the class of PC you want. The next step is to decide whether you want a top of the range, midrange or an entry-level machine. Take the single-user, static PC. Today's entry-level machine is an Intel 386 or 386SX PC with 4M of RAM, 80M hard disk and a VGA monitor. The midrange is currently an Intel 486SX-based PC running at 33MHz with 4M of RAM and 100 to 200M hard disk and an SVGA screen. The top-of-the-range basic configuration is an Intel 486DX/50 or 66MHz, or possibly a Pentium machine, with 16M of RAM and 700M or more hard disk storage and an SVGA screen.

Most buyers are focusing on these three configurations for their static PCs. Use the 'Choose your size' chart to help make the hardware selection. Don't be worried if these configurations do not exactly match your complete requirements; there is another step at which you can fine-tune your selection. Use the variable elements following as criteria for selecting the PC and retailer of your choice. For example, if extra RAM is essential for a vital application, it should come higher on your list of priorities than extra hard disk

## Step two: select your size

Class of PC	Position	Typical PC
Server	Bottom.....	486/25
	Middle.....	486DX/25/50-66
	Top.....	Pentium
Single user	Bottom.....	386SX/25, 4M RAM, six 16-bit & two 8-bit slots, 80M hard disk
	Middle.....	486SX/33, 8M RAM, 126K cache, seve 16-bit & one 8-bit slots 120M hard disk
	Top.....	486DX/66, 16M RAM, VESA bus, 500M hard disk
Portable	Bottom.....	Mono 386SLX/25, 2M RAM, 40M hard disk
	Middle.....	passive colour 386/33, 4M RAM 120M hard disk
	Top.....	Active colour 486DX/50, 4M RAM, 200M hard disk
LAN workstation	Bottom.....	386SX/25, 4M RAM
	Top.....	486SX/33, 4M RAM

## How to select your basic PC

Having completed the basic



space, despite the added performance the latter would give.

**CACHE** A small amount of cache memory resting between disk storage and main storage helps performance enormously. Additional cache will prove a sound investment for direct buyers.

**COPROCESSOR** In PCs below full 486 level, a coprocessor can usually improve performance on applications which involve complex calculations. Graphics applications and image modelling are good examples of this.

**EXPANSION SLOTS** If you need to heavily customise the basic choice, you may need several expansion slots to achieve your tailored system. You should also ask if you need the extra 32-bit performance of Micro Channel Architecture (MCA), Extended Industry Standard Architecture (EISA) or VESA (Video Electronics Standards Association) bus slots. Otherwise the standard 16-bit ISA bus should fit the bill.

**EXTENDED MEMORY** Some retailers include extra memory. If not it could need increasing up to 16 or even 32M.

**HARD DISK SIZE** Bigger is generally better. Check if you need a very big disk; make sure you not just be taking up disk space with utilities and applications you hardly ever run.

**KEYBOARD QUALITY** An important criteria often overlooked is the quality of the PC keyboard. Some retailers try to cut costs by cutting keyboard quality. Insist on the best. A crisp, well designed keyboard cuts stress.

**RAM SIZE** Basic memory is getting cheaper, so again bigger is better. 32-bit operating systems have broken the previous limitations on memory addressing and performance often increases proportionally with the more memory available.

**SPEED** It is often worth trading up to the next speed microprocessor for a few extra

dollars. This may cut the need for a coprocessor; it will almost certainly increase response times.

**STORAGE EXPANSION** Beyond the conventional hard disk, there are increasing choices in expanded storage, including removable hard disks, floptical disks, tape drives and CD-ROM. See our Storage Selector Chart for options and choose accordingly. Large applications are increasingly using CD-ROM for software distribution.

**UPGRADABILITY** Over-Drive processors, ZIF (Zero Insertion Force) sockets and upgrade boards have widened the range of upgrade options. Make sure the machine you choose can be upgraded in the way you want, as there are several standard and proprietary upgrade paths.

## How to select software

Selecting software — both system and application software — is easier than selecting hardware. The simple rule is: if you like it and can afford it, buy it. Within this simple rule a number of issues are worth outlining to help you get what you want from the direct channel. Use the 'Choose your software' table to select the software you need, and remember a frequently used utility program can deliver more productivity than a seldom used application. Look for general use utility software which can boost output for all users and applications.

## How to select peripherals

Narrowing down the field, you can choose the additional peripherals which give extra power to your PC and software. The two largest decisions for peripherals are printers and extended storage. A printer is the public face of your PC: how do you want to look? Will casual output fulfil your requirements or do you need formal presentation

## Choose your software: buyer's checklist

**Is the package compatible?** It needs to run on your chosen system unless you are looking to upgrade. Check if the package can import data and export data in standard formats.

**Does the package do what you want?** Check usage against package feature to maximise your software investment. Can it use special macros or third-party solutions based on the package?

**Will the package grow as your needs grow?** Decide what the extreme limits you require are likely to be and select software which can handle this.

**Does the package perform fast enough on your PC?** Make sure any software trials are performed on PCs similarly configured to the one you will be using the software on.

**Does the package contain a sufficient level of support?** Context-sensitive and right button help should be included. Run through a demonstration of the package and make illegal choices to see what happens. Does the software guide users to the proper choices or just beep at them?

**Is the package well priced?** Can you negotiate with a supplier for training alongside the package? Can you win assurances on special upgrade prices for the next version of the package? Is extra staff training going to be required at extra cost?

**Will the package be well supported?** Is it developed by a retailer with a track record which can be checked? Is it from a small local retailer who can be called in quickly?

quality? In selecting extended storage, you must balance three important requirements: speed of data access, volume of data storage, and price. Use the 'Storage choices' and 'Printer choices' tables to help establish what you want.

## How to test hardware

Hardware testing benchmarks rely on single or group of

specific tests, giving a result which tries to give a broader indication of a PC's capabilities. The tests are designed to be influenced by several of the internal components of your PC, and their main advantage is that the results are easy to understand and quick to run.

To some extent, all tests are

*Continued on page 54*

## Storage choices

Storage device	Specification
Floppy disks	3.5in with 1.44M capacity 5.25in with 1.2M capacity
Removable hard disk	40M and above capacity with 4.5M/min and above transfer rate
Tape	200M to over 1.3G capacity at speeds from 2.5M/min and above
Optical disk	3.5in rewritable with 128M and above data capacity 5.25in rewritable with 200M to 1G capacity 900M capacity with a 7M/sec transfer rate on a WORM (write once, read many) device
Floptical	21M capacity with normal transfer rates





## It's a jungle out there

BY JEREMY TORR

*Getting multimedia onto your PC has to be the best idea around since Windows hit the shops. So, if you are thinking of taking the plunge into CD-ROMs, sound cards and talking PCs, here are a few indicators about the best way to make the transition from mono to multimedia as cost effective as possible.*

**B**efore you rush out and buy that multimedia upgrade kit from your local dealer, post off for the latest sound and video factory, or start by adding ingredients one at a time, be careful: multimedia can bite. Just as in the early days of any new technology, there are plenty of pitfalls just waiting for the unwary to fall into. Compatibility, configuration, installation and operation all need a slightly different view to those we have become used to. Self-configuring software and such luxuries as completely standard cables, chips, connectors, and in fact most other links into your PC, are still a distant possibility where multimedia is concerned. Proprietary standards and features abound in the world of CD-ROM drives, sound cards and input and output connectors. Having said that, there are one or two de facto standards that seem to be establishing themselves. In sound card specs, look for AdLib and SoundBlaster compatibility. CD-ROM drives should adhere to the MPC (Multimedia PC) or High Sierra specification, and video cards ideally should be capable of handling Video for Windows, VideoBlaster or Indeo formats.

Bearing in mind this wealth of possible mis-connections and compatibilities, one of the first questions any would-be multimediaist must ask is: what backup do I get? Having clinched the deal of the decade for a new double-speed ROM drive is of little use if audio connector cables can only be sourced direct from Malaysia at \$20 each. Buying direct from a well-established player in the field is

obviously an advantage, but remember your local shop can often provide valuable troubleshooting that beats any over-the-phone advice. At the very least you should be able to demand free troubleshooting and advice; at best the retailer should offer to set up the system for you in your PC. The latter might cost you a few dollars extra, but will be well worth it. Remember, if your retailer does set your multimedia system up, keep a record of all jumpers, boot and system files and all other configuration details. These can be invaluable if something crashes your system in the future.

### Package deals

The other central issue in any purchase is price. Prices for all the main ingredients in a typical multimedia setup: sound card, CD-ROM drive, speakers and possibly a video capture card are all dropping rapidly. So don't be afraid to shop around. Some of the major high street stores are now getting in on the act, and although you should not expect such a high level of expertise as from a specialist retailer, you may well find you can get better credit facilities if you are willing to buy the whole package in one go. Just be sure you are not getting last year's stock though. Major stores sometimes have to offload a warehouse full of yesterday's technology and will use clever marketing to make it look like tomorrow's flavour.

Once you have established backup, and performance and price are keeping a sensible balance against each other, you can start to check out the technicalities. If you

# BUYER'S GUIDE TO MULTIMEDIA



are not to get left behind as more multimedia software becomes available, make sure you are getting equipment that will handle the next possibilities. Sound cards should preferably be 16-bit, not just 8-bit, and double-speed CD-ROM drives are now becoming so readily available you are

## Equipment needed

Minimum equipment to run successful multimedia to MPC standard:

- Intel 386 or better, running at least 20MHz
- At least 2M, preferably 4-6M RAM
- At least 40M hard drive
- VGA or better monitor
- At least two spare AT bus slots, 16-bit preferred
- At least 100W power supply

Then you will need to install:

- CD-ROM drive with more than 150Kbps transfer rate
- A sound card with at least 8-bit resolution and 22MHz sampling rate
- External speakers

fully justified in asking for a cheaper rate for standard speed units. CD-ROM drives using SCSI controllers will give you more expandability and configurability than those using their own dedicated controllers, but will generally cost more.

The other thing to watch out for is the install options. The more DMA, IRQ and memory address options on all the new cards and controllers, the better. This will help you avoid data clashes with your existing equipment and expansion cards when you put the new multimedia controllers and cards in the expansion slots. Generally speaking, the cheaper the card, the fewer the options you get; so if flexibility is a must expect to spend more. If you do have a potential clash of IRQs or

anything else, try to get the retailer to sort it out in advance, or at least suggest several options you could try to get everything to work. Of course, going for a complete kit with ROM drive and controller, sound card and wiring will help avoid such problems — as long as you don't have too many modems, fax cards and scanners in there already, that is.

Buying a complete package can benefit you by not only giving integrated instructions which tell you how to use all the components in an integrated fashion, but also including some freebies. Very often multimedia package buyers get a whole bagful of CDs thrown in for nix. This can include a useful extra such as an encyclopaedia; useless extras as Great Cities or Horsetrams of the World, or some of the newer CD-ROM-based games. These can include some really good graphic action and movie-like footage. Whatever their value (monetary or intrinsic) they will certainly get you started on the sure to multimedia familiarity.

## Extra specials

Other specials which you may be able to wrangle out of the retailer could include powered speakers, various cables, a CD-ROM drive mounting kit and microphones. All these extras will normally cost you extra, yet are essential to get the most out of your system. Don't be surprised if the special cables you need to link SCSI drives, sound card audio links, speaker output connectors and video camera to grabber cards come at a hefty premium. Some can cost up to three figures so check before you buy. Musical composers will need to be sure they can connect a MIDI breakout box. This will allow you to plug in a MIDI-compatible keyboard, synthesizer, drumkit or whatever and produce quick yet very sophisticated music soundtracks for your multimedia presentations. Or just for your own pleasure, too.

Although most sound boards are listed as having a MIDI interface, you will usually also need an extra connector or breakout box to link directly into the external musical source. And don't think that just because you have a notebook you can't get into multimedia. Some notebooks now come with SCSI ports for CD-ROM drive connection and others can use the parallel port to link into ROM players. For sound output and input, both Logitech and SoundBlaster offer self-powered plug-in sound modules especially for the notebook user so you can rapidly use up all that precious hard disk space.

Lastly, when selecting any multimedia hardware, check your selection includes some bundled application software. At the very least you will need a sound mixer, recorder and player for .WAV and .VOC files, a CD-player utility and possibly some voice recognition software as well. Many cards now offer a good selection of creative, business and editing software in both Windows and DOS formats. But whichever equipment you decide to go for, be ready to spend many late nights exploring all those 600M of new sound, video and animation data you will have access to on each new CD-ROM. Multimedia; who needs insomnia? *ds*

## A good deal

What you could ask for in a good deal:

- Bundled CD-ROMs and application software
- All cabling
- Bundled shielded speakers
- Microphone
- Mounting kit for drives
- CD Manager software
- CD-ROM caching utilities
- Free installation and configuration
- CD-ROM club membership
- Phone or onsite backup



## GRAPHICS ADAPTORS

**W**ith the increasing use of Windows and multimedia applications, the video graphics adaptor is one of the most important components of the PC. Video performance is probably the greatest bottleneck in overall PC performance with these type of applications.

### What to look for

**Standards supported** The monitor should be capable of handling the video standard of the adaptor.

**Memory** The amount of memory on the board affects the resolution and the number of colours displayed. Look for the amount of standard memory offered and the memory upgrade options available. Also, cards which use VRAM (video RAM) are faster than those using standard RAM.

**Graphic accelerator boards** These use chips that accept

graphics functions from the CPU and translate them into image information. They can improve performance by up to a factor of 10. Coprocessed boards can be programmed to accept other functions, making them more versatile but also more costly.

### Explanation of terms

**Standard display memory onboard** The amount of memory fitted on the controller board.

**Maximum display memory** The maximum amount of memory which can be fitted on the controller board.

**Non-interlaced** Interlaced monitors scan the screen twice to build an image, displaying alternate lines at each pass. When displaying a moving image at high resolution, this may lead to blurring. A non-interlaced display overcomes this problem by scanning the entire image in a single pass.

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 800 by 600 (16 colours)	Supports SVGA 800 by 600 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 NI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
Accel Series - Eizo AA-S1-1	Megavision (02) 975 1877	Eizo	I	N/S	✓	✓	✓	✓	✓	✓	1280 by 1024 (256) at 72Hz	2	2	✓	AutoCAD, Microstation, OS/2	12 months	\$3300
Accel Series Eizo AA-41-1	Megavision (02) 975 1877	Eizo	I	N/S	✓	✓	✓	✓			N/S	1	1	✓	AutoCAD, Microstation, OS/2	12 months	\$2010
Accel Series Eizo AC41-1	Megavision (02) 975 1877	Eizo	I	N/S	✓	✓	✓	✓			N/S	1	1	✓	AutoCAD, Microstation, OS/2	12 months	\$2250
Accel Series Eizo ACS1-1	Megavision (02) 975 1877	Eizo	I	N/S	✓	✓	✓	✓	✓		N/S	2	2	✓	AutoCAD, Microstation, OS/2	12 months	\$3570
Actix Graphics Engine 32 Plus	Sprinter Products (02) 977 8155	Actix Systems	I	S3	✓	✓	✓	✓	✓	✓	640 by 480, 1280 by 1024 (256)	1	2	✓	AutoCAD DLP	12 months	\$438
Actix Graphics Engine 32 VL Plus	Sprinter Products (02) 977 8155	Actix Systems	V	S3	✓	✓	✓	✓	✓	✓	640 by 480 (16.7M), 1280 by 1024 (256)	1	2	✓	AutoCAD DLP	12 months	\$522
Actix Graphics Engine Ultra Plus	Sprinter Products (02) 977 8155	Actix Systems	I	S3	✓	✓	✓	✓	✓	✓	640 by 480 (16.7M)	1	2	✓	AutoCAD	12 months	\$714
ATI 128QWL24	Computer Vision (03) 585 1688	Computer Vision	V	ATI	✓	✓	✓	✓	✓	✓	1280 by 1024 NI (16M)	2	2	✓	N/S	2 years	\$1088
ATI Graphics Ultra Plus	Sealcorp Computer Products (02) 319 4611 Merid (02) 862 8888 Arabelle Bils (02) 313 6155	ATI Technologies	I	Mach 32	✓	✓	✓	✓		✓	1280 by 1024, (256), 1024 by 768, (850), 800 by 600, (16.7M)	2	2	✓	OS/2, Unix, CAD, VESA 8514	5 years	From \$655
ATI Graphics Ultra Pro	Sealcorp Computer Products (02) 319 4611 Merid (02) 862 8888 Arabelle Bils (02) 313 6155	ATI Technologies	I	Mach 32	✓	✓	✓	✓	✓	✓	1280 by 1024 (256), 1024 by 768 (850), 800 by 600 (16.7M)	1	2	✓	OS/2, Unix, CAD, VESA 8514	5 years	From \$855

### KEY

Bus type E — EISA I — ISA M — MCA V — Local (VESA)  
 Other standards supported Number in brackets () indicates the number of colours supported  
 I — Interlaced NI — Non-interlaced N/S — Not specified



# GRAPHICS ADAPTORS

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 600 by 600 (16 colours)	Supports SVGA 800 by 600 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 NI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
ATI Graphics Ultra Pro EISA	Seakorp Computer Products (02) 319 4611	ATI Technologies	E	Mach 32	✓	✓	✓	✓	✓	✓	1280 by 1024 (256), 1024 by 768 (65K), 800 by 600 (16.7M)	2	2	✓	OS/2, Unix, CAD, VESA BS14	5 years	\$1055
ATI Graphics Ultra Pro MCA	Seakorp Computer Products (02) 319 4611	ATI Technologies	M	Mach 32	✓	✓	✓	✓	✓	✓	1280 by 1024 (256), 1024 by 768 (65K), 800 by 600 (16.7M)	2	2	✓	OS/2, Unix, CAD, VESA BS14	5 years	\$1055
CabEye/X ISA XGA-2	Synaptic (02) 555 9560	Advanced Graphics Technology	I	N/S	✓	✓	✓	✓	✓	✓	1024 by 768 (256), 1360 by 1024 (116), 640 by 480 (65K), 800 by 600 (65K)	1	1	✓	AutoCAD, OS/2 2.1 (ships with OS/2), Windows NT	12 months	\$495
Chetish 2 The Max VESA	Auspac Computers (02) 748 4822	TNC	V	Cirrus Logic	✓	✓	✓	✓	✓	✓	8514A	1	2	✓	AutoCAD, GEM, Lotus, OS/2, Unix, Xenix, WordPerfect, WordStar	12 months	\$270
Cirrus 1280V24	Computer Vision (03) 585 1888	Computer Vision	V	Cirrus Logic	✓	✓	✓	✓	✓	✓	N/S	1	2	✓	N/S	2 years	\$382
Cirrus Logic Win Evolution	Multisource (02) 955 8100	Prolink	I	Cirrus Logic	✓	✓					N/S	1	2	✓	N/S	12 months	From \$154
Compaq D-Vision	Compaq Computer (02) 911 1999	Compaq Computer Corporation	I, E	C128084-004	✓	✓	✓	✓			N/S	1	1	✓	N/S	12 months	\$972
Diamond Speed	Chips and Bits (03) 696 5955	Diamond Computer Systems	I	Cirrus Logic CL-605426	✓	✓	✓	✓	✓	✓	None	1	1	✓	AutoCAD, Lotus, AutoShape, WordPerfect	5 years	\$395
Diamond Stealth 24	Chips and Bits (03) 696 5955	Diamond Computer Systems	I	S3 801	✓	✓	✓	✓	✓	✓	Truecolour, VESA	1	1	✓	AutoCAD, VesaCAD, WordPerfect	5 years	\$495
Diamond Stealth 24VLB	Chips and Bits (03) 696 5955	Diamond Computer Systems	V	S3 805	✓	✓	✓	✓	✓	✓	Truecolour, VESA	1	1	✓	AutoCAD, VesaCAD, WordPerfect	5 years	\$545
Dual VGA Flat Panel	MegaVision (02) 975 1877	Colorgraphic	I	N/S	✓						320 by 200, 640 by 480	256K	256K	✓	N/S	12 months	\$2810
Eizo MD-809 MK II	MegaVision (02) 975 1877	Eizo	I	C&T 8514A					✓		1664 by 1200, 1536 by 1150	512K	1	✓	N/S	12 months	\$3090
Eizo Omniverse 50	MegaVision (02) 975 1877	Eizo	S3		✓	✓	✓	✓	✓	✓	1152 by 864, 1600 by 1200 I	2	2	✓	AutoCAD, OS/2, Microstation	12 months	\$2130
Eizo Omniverse 60	MegaVision (02) 975 1877	Eizo	I	S3	✓	✓	✓	✓	✓	✓	1152 by 864, 1600 by 1200, 1536 by 1152, 2048 by 1152, 2048 by 1536	4	4	✓	AutoCAD, OS/2, Microstation	12 months	\$3330
Ergo 1280	Computer Vision (03) 585 1888	Computer Vision	I	ET4000	✓	✓	✓	✓	✓	✓	N/S	1	1	✓	N/S	2 years	\$195
Ergo 1280/VL24	Computer Vision (03) 585 1888	Computer Vision	V	ET4000	✓	✓	✓	✓	✓	✓	N/S	1	1	✓	N/S	2 years	\$439
Everex Viewpoint NI VGA	Multisource (02) 955 8100	Everex Systems	I	N/S	✓	✓	✓	✓			N/S	256K	512K		N/S	12 months	\$276

## KEY

Bus type  
Other standards supported

E — EISA  
I — ISA  
Number in brackets ( ) indicates the number of colours supported  
I — Interlaced  
NI — Non-Interlaced

M — MCA  
V — Local (VESA)  
N/S — Not specified

# GRAPHICS ADAPTORS

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 800 by 600 (16 colours)	Supports SVGA 800 by 600 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 NI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
Everex Viewpoint Standard	Multisource (02) 955 8100	Everex Systems	I	N/S	✓						N/S	256K	256K		N/S	12 months	\$120
Fahrenheit 1280 Plus - ISA Bus	Micro Spares (03) 379 3189	Ochrid Technology	I	S3 89C801	✓	✓	✓	✓	✓		640 by 480 (16.8M), 640 by 480 (65K), 1024 by 768 (65K)	1	1	✓	OS/2, CAD	4 years	\$458
Graphics Station Gold	ACA Pacific (03) 388 0477	Hercules Computer Technology	I	TI TMS34010	✓	✓	✓	✓			N/S	1	3	✓	N/S	2 years	\$825
Hercules Chrome	ACA Pacific (03) 388 0477	Hercules Computer Technology	I	TI TMS34020	✓	✓	✓	✓			1152 by 900 24 bit, dual page	4	40	✓	N/S	2 years	From \$2746
Hercules Dynamite VL	ACA Pacific (03) 388 0477	Hercules Computer Technology	V	Tseng Labs ET-4000	✓	✓	✓	✓	✓		N/S	1	1	✓	N/S	2 years	\$425
Hercules Graphics Station Card	ACA Pacific (03) 388 0477	Hercules Computer Technology	I	TI TMS34010	✓	✓	✓	✓			N/S	1	3	✓	N/S	2 years	From \$1147
Hercules Graphics Station Card GB 1024-2	ACA Pacific (03) 388 0477	Hercules Computer Technology	I, M	TI TMS34010	✓	✓	✓	✓			N/S	3	3	✓	N/S	2 years	\$1305
Hercules Graphics Station Gold 16-2	ACA Pacific (03) 388 0477	Hercules Computer Technology	I, M	TI TMS34010	✓	✓	✓	✓			N/S	3	3	✓	N/S	2 years	\$1113
Hercules Graphics Station Gold 16-4	ACA Pacific (03) 388 0477	Hercules Computer Technology	I	TI TMS34010	✓	✓	✓	✓			N/S	3	3	✓	N/S	2 years	\$1271
Hercules Graphics Station MC	ACA Pacific (03) 388 0477	Hercules Computer Technology	M	TI TMS34010	✓	✓	✓	✓			NTSC, PAL	1	8	✓	N/S	2 years	From \$1311
Hercules Graphite Card	ACA Pacific (03) 388 0477	Hercules Computer Technology	I, V	ITT X14	✓	✓	✓	✓			1280 by 1024, 1152 by 900 (16)	1	1	✓	N/S	2 years	\$859
Hercules Superstation 3D	ACA Pacific (03) 388 0477	Hercules Computer Technology	I, E	TI TMS34020	✓	✓	✓	✓	✓	✓	NTSC, PAL	2	18	✓	N/S	2 years	From \$7091
Hercules Superstation XP600	ACA Pacific (03) 388 0477	Hercules Computer Technology	I	TI TMS34020	✓	✓	✓	✓			1280 by 1024, 1600 by 1280	1	20	✓	N/S	2 years	From \$2006
Kingston View Rx	Australian Memory (02) 899 9537	Kingston Technology	I	W5186	✓	✓	✓	✓			N/S	512K	512K	✓	AutoCAD, Lotus, WordPerfect, Ventura	5 years	\$291
MVPVGA2 - Dual VGA Adapter	InterWorld Electronics & Computer Industries (03) 563 5011	Industrial Computer Source	I	ET-4000	✓	✓	✓	✓	✓		1280 by 1024	512K	1M	✓	OS/2	12 months	\$2150
NDI AT2000	Alkira (02) 876 8000	National Design	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1600 by 1280	1	4	✓	AutoCAD	3 years	\$2850
NDI AT2004	Alkira (02) 876 8000	National Design	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1024 by 768 (16.7M)	4	4	✓	AutoCAD	3 years	\$3800
NDI MC1000	Alkira (02) 876 8000	National Design	M	TI TMS34020	✓	✓	✓	✓			N/S	1	1	✓	AutoCAD	3 years	\$1900

## KEY

Bus type

Other standards supported

E — EISA

Number in brackets () indicates the number of colours supported

I — Interlaced

I — ISA

NI — Non-interlaced

M — MCA

N/S — Not specified

V — Local (VESA)

# GRAPHICS ADAPTORS

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 800 by 600 (16 colours)	Supports SVGA 800 by 600 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 HI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
NDI Warp 10 Plus	Alkira (02) 876 8000	National Design	I	S3 86C801	✓	✓	✓	✓	✓		1152 by 900 (16), 800 by 600 (65K), 640 by 480 (16.7M)	1	1	✓	AutoCAD, Lotus, X-Windows	3 years	\$535
NDI Warp 10LB	Alkira (02) 876 8000	National Design	V	S3 86C905	✓	✓	✓	✓	✓	✓	1152 by 900 (16), 800 by 600 (65K), 640 by 480 (16.7M)	1	2	✓	AutoCAD, Lotus, X-Windows	3 years	\$665
No 9 GXE L10	Focal Point Computing (03) 525 1144	Number Nine	L.V	S3	✓	✓	✓	✓	✓		1024 by 1024, 1024 by 768	1	1	✓	AutoCAD	5 years	\$995
No 9 GXE L11	Focal Point Computing (03) 525 1144	Number Nine	L.V	S3	✓	✓	✓	✓	✓	✓	2048 by 1024, 1280 by 1024	2	2	✓	AutoCAD	5 years	\$995
No 9 GXE L12	Focal Point Computing (03) 525 1144	Number Nine	L.V	S3	✓	✓	✓	✓	✓	✓	2048 by 1024, 1152 by 810	3	3	✓	AutoCAD	5 years	\$1195
No 9 GXI L20	Focal Point Computing (03) 525 1144	Number Nine	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1024 by 1024, 1024 by 810	1	2	✓	AutoCAD	5 years	\$1545
No 9 GXI L21	Focal Point Computing (03) 525 1144	Number Nine	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1280 by 1024 (16), 1152 by 870 (256)	2	2	✓	AutoCAD	5 years	\$1965
No 9 GXI L25	Focal Point Computing (03) 525 1144	Number Nine	L.M	TI TMS34010	✓	✓	✓	✓	✓	✓	1280 by 1024 (16), 1280 by 1024 (256)	3	6	✓	AutoCAD	5 years	\$3695
No 9 GXI L27	Focal Point Computing (03) 525 1144	Number Nine	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1024 by 768 (65K), 1024 by 768 (16.7M), 1280 by 1024 (16), 1280 by 1024 (256), 1152 by 870 (256)	6	6	✓	AutoCAD	5 years	\$4695
No 9 GXI L29	Focal Point Computing (03) 525 1144	Number Nine	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1152 by 870 (256), 1280 by 1024 (65K), 1280 by 1024 (256), 1024 by 768 (16.7M), 1024 by 768 (65K), 1152 by 870 (16.7M)	5	5	✓	AutoCAD	5 years	\$4095
No 9 GXI TC 1600	Focal Point Computing (03) 525 1144	Number Nine	I	TI TMS34020	✓	✓	✓	✓	✓	✓	1600 by 1200	5	5	✓	AutoCAD	5 years	\$4695
No 9 GXI L23	Focal Point Computing (03) 525 1144	Number Nine	L.M	TI TMS34020	✓	✓	✓	✓	✓	✓	2048 by 1024, 1152 by 810	2	3	✓	AutoCAD	5 years	\$2895
Orchid Celsius	Micro Spares (03) 379 3189	Orchid Technology	V	ITT AGX015	✓	✓	✓	✓		✓	640 by 480 (16.8M), 640 by 480 (65K), 1024 by 768 (65K)	2	2	✓	OS/2, CAD	4 years	\$566
Orchid Fahrenheit 1280 Plus - VESA Local Bus	Micro Spares (03) 379 3189	Orchid Technology	V	S3 86C805	✓	✓	✓	✓		✓	640 by 480 (16.8M), 640 by 480 (65K), 1024 by 768 (65K)	2	2	✓	OS/2, CAD	4 years	\$512
Orchid Fahrenheit VA - ISA Bus	Micro Spares (03) 379 3189	Orchid Technology	I	S3 86C801	✓	✓	✓	✓		✓	640 by 480 (16.8M), 640 by 480 (65K), 1024 by 768 (65K)	1	1	✓	OS/2, CAD, Voice Annotation	4 years	\$539
Orchid Fahrenheit VA - VESA Local Bus	Micro Spares (03) 379 3189	Orchid Technology	V	S3 86C805	✓	✓	✓	✓		✓	640 by 480 (16.8M), 640 by 480 (65K), 1024 by 768	2	2	✓	OS/2, CAD, Voice Annotation	4 years	\$566

## KEY

Bus type  
Other standards supported

E — EISA

Number in brackets ( ) indicates the number of colours supported

I — Interlaced

I — ISA

N — Non-interlaced

M — MCA

N/S — Not specified

V — Local (VESA)



# GRAPHICS ADAPTORS

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 600 by 600 (16 colours)	Supports SVGA 800 by 800 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 HI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
Orchid P9000	Micro Spares (03) 379 3189	Orchid Technology	I	Webk Power 9000, Webk WS286 SVGA	✓	✓	✓	✓	✓	✓	800 by 600 (16.8M), 1280 by 1024 (256), 1600 by 1200 (256)	1D, 2V	1D, 2V	✓	OS/2, CAD	4 years	\$1042
Orchid ProDesigner II S	Micro Spares (03) 379 3189	Orchid Technology	I	Tsang Labs ET 4000AX	✓	✓	✓	✓			640 by 480 (32K), 800 by 600 (65K)	1	1	✓	OS/2, CAD, Unix	4 years	\$350
Paradise Accelerator	Weston (03) 763 9577	Western Digital	I	WD	✓	✓	✓	✓	✓	✓	640 by 480 (32K), 640 by 480 (16.8M)	1	1	✓	Cadence, Generic Cadd, AutoShade, PCAD, VersaCAD, AutoCAD, WordPerfect, Lotus, Word, Symphony	3 years	\$224
Paradise Accelerator Pro	Weston (03) 763 9577	Western Digital	I	WD	✓	✓	✓	✓	✓	✓	1280 by 960 (16)	1	2	✓	Cadence, Generic Cadd, AutoShade, PCAD, VersaCAD, AutoCAD, WordPerfect, Lotus, Word, Symphony	3 years	\$569
Paradise Accelerator VL Plus	Weston (03) 763 9577	Western Digital	V	WD	✓	✓	✓	✓	✓	✓	NS	1	2	✓	Cadence, Generic Cadd, AutoShade, PCAD, VersaCAD, AutoCAD, WordPerfect, Lotus, Word, Symphony	3 years	\$334
Porchester Image Sharpener MVA-AVGA3B	Porchester Computers (03) 537 2722	Porchester	I	Cirus Logic	✓	✓	✓	✓	✓		True Colour	1	2	✓	AutoCAD, AutoShade, GEM, Lotus, Ventura, Word, WordPerfect, WordStar	12 months	\$175
Porchester Image Sharpener MVA-AVGA3VL	Porchester Computers (03) 537 2722	Porchester	I	Cirus Logic	✓	✓	✓	✓	✓		True Colour	1	2	✓	AutoCAD, AutoShade, GEM, Lotus, Ventura, Word, WordPerfect, WordStar	12 months	\$255
Orvision 1280	Compaq Computer (02) 911 1899	Compaq Computer	I, E	NS	✓	✓	✓	✓	✓		NS	2	2	✓	N/S	12 months	\$1144
Radius SVGA Multiview	Tech Pacific (02) 697 8666	Radius	I, M	Headland	✓	✓	✓	✓	✓		NS	1	1	✓	N/S	12 months	From \$659
Radius SVGA Multiview 24 Accelerator	Tech Pacific (02) 697 8666	Radius	I	WD							NS	3	3	✓	N/S	12 months	\$4350
S3 Truespeed	Acropac Computers (02) 748 4822	TNC	I	S3 PC86C801	✓	✓	✓	✓	✓	✓	8514/A	1	1	✓	VersaCAD, AutoCAD, Lotus, Unix, Xerox, WordPerfect	12 months	\$300
S3C 801 Win Accelerator	Multisource (02) 955 8100	Prolink	I	S3	✓	✓					NS	1	2	✓	N/S	12 months	\$293
STB Dual VGA Adaptor I/M	MegaVision (02) 975 1877	STB Systems	I	2 by Tsang Lab ET4000	✓	✓	✓	✓			1280 by 480 (16 over 2 screens)	1	2	✓	N/S	12 months	\$2610
STB ERGO-VGA/ML	MegaVision (02) 975 1877	STB Systems	I	Tsang Lab ET4000	✓	✓	✓	✓	✓		NS	1	1	✓	OS/2 PM, WordStar, WordPerfect	12 months	\$654
STB Powergraph VL24	MegaVision (02) 975 1877	STB Systems	I	S3	✓	✓	✓	✓	✓		1240 by 960	1	1	✓	AutoCAD, Microstation	12 months	\$714

## KEY

Bus type                      E — EISA                      I — ISA                      M — MCA                      V — Local (VESA)  
 Other standards supported      Number in brackets () indicates the number of colours supported  
    I — Interlaced                      NI — Non-interlaced                      N/S — Not specified

# GRAPHICS ADAPTORS

Product name	Distributor	Manufacturer	Bus type	Onboard chip type	Supports SVGA 800 by 600 (16 colours)	Supports SVGA 800 by 600 (256 colours)	Supports VGA 1024 by 768 (16 colours)	Supports VGA 1024 by 768 (256 colours)	Supports VGA 1280 by 1024 NI	Supports VGA 1280 by 1024 I	Other standards supported	Display memory on board (M)	Maximum display memory (M)	Windows driver included	Other drivers included	Warranty	Price (including tax)
STB PowerGraph X24	Megavision (02) 975 1877	STB Systems	I	S3	✓	✓	✓	✓			1280 by 960 (4 bit colour)	1	1	✓	AutoCAD V12	12 months	\$594
STB Quadro Port VGA Adaptor	Megavision (02) 975 1877	STB Systems	I	4 by Tseng Lab ET4000	✓	✓	✓	✓			N/S	1	4	✓	N/S	12 months	\$4250
Stealth Pro	Chips and Bits (03) 696 5965	Diamond Computer Systems	I	S3 928	✓	✓	✓	✓	✓		VESA, Truecolour	1	2	✓	AutoCAD, Cadkey, VersaCAD, WordPerfect 5.1	5 years	\$895
Stealth Pro VLB	Chips and Bits (03) 696 5965	Diamond Computer Systems	V	S3 928	✓	✓	✓	✓	✓	✓	VESA, Truecolour	1	2	✓	AutoCAD, Cadkey, VersaCAD, WordPerfect 5.1	5 years	\$895
Stealth Viper	Chips and Bits (03) 696 5965	Diamond Computer Systems	V	Wend P9000	✓	✓	✓	✓	✓	✓	Truecolour, VESA	2	2	✓	AutoCAD, 3D studio	5 years	\$1090
Super Dual VGA	Megavision (02) 975 1877	Colorgraphic	I, M	Tseng Lab	✓	✓	✓				320 by 200, 640 by 480	512K	512K	✓	Geoworks, New Wave	12 months	\$2610
Trident 9800CL SVGA	Multisources (02) 965 6100	Prolink	I	Trident	✓	✓					N/S	1M	1M	✓	N/S	12 months	\$131
Truevision 1024 - 32 for Windows	Vision Control (03) 819 0277	Truevision	I	N/S	✓	✓	✓	✓			PAL, NTSC	1	16	✓	N/S	12 months	\$4724
Truevision Bravo4 8/15 for Windows 3.0 or DOS	Vision Control (03) 819 0277	Truevision	I	ET 4000	✓	✓	✓	✓			800 by 600 (32K), NTSC, PAL	1	1	✓	Video for Windows	12 months	\$2573
Tseng 16M Colour	G & A Computer Technology (02) 718 1160 Alfa Computers (02) 317 3344	Tseng Labs	I	Tseng Labs	✓	✓	✓	✓			XGA	1	1	✓	N/S	12 months	From \$140
Tseng Labs Mega EVA	Chips and Bits (03) 696 5965 Alfa Computers (02) 317 3344	Tseng Labs	I	ET 4000	✓	✓	✓	✓			True colour, Targa, XGA, VESA	1	1		AutoCAD, WordPerfect 5.1, Lotus	12 months	From \$275
Tseng Labs W32 Accelerator	Chips and Bits (03) 696 5965 Alfa Computers (02) 317 3344	Tseng Labs	I	ET 4000 W32	✓	✓	✓	✓	✓		VESA, Truecolour	2	2	✓	AutoCAD, Lotus	12 months	From \$395
Tseng Labs W32 VLB	Chips and Bits (03) 696 5965 Alfa Computers (02) 317 3344	Tseng Labs	V	ET 4000 W32	✓	✓	✓	✓	✓		VESA, Truecolour	1	4	✓	AutoCAD, Lotus	12 months	\$345
Turbo 1280	Computer Vision (03) 565 1668	Computer Vision	I	S3	✓	✓	✓	✓	✓	✓	N/S	1	1	✓	N/S	2 years	\$439
Twin Turbo Accelerator	Megavision (02) 975 1877	Colorgraphic	I	S3	✓	✓	✓	✓	✓		320 by 200, 640 by 480	1	1	✓	OS/2, Unix,	12 months	\$2610
VGA+ Videographics Card	Vision Control (03) 819 0277	VisionETICS	I	N/S							N/S	1	2	✓	N/S	3 months	\$2900
Vista Display Adaptor	Vision Control (03) 819 0277	Truevision	I	TI TMS34010							N/S	1	14M-32 bit	✓	N/S	12 months	\$6000

## KEY

Bus type  
Other standards supported

E — EISA  
Number in brackets ( ) indicates the number of colours supported  
I — Interlaced

I — ISA  
NI — Non-interlaced

M — MCA  
N/S — Not specified

V — Local (VESA)

## CD-ROM DRIVES

**C**D-ROMs (compact disk read only memory) provide an inexpensive medium for the distribution of information. Capable of holding up to 680M on a single disk, data is recorded with a laser beam which burns a bubble on the surface.

To handle a CD-ROM player, you will need an open expansion slot or port and a hard disk. CD-ROM titles may take 0.5M to 4.5M of hard disk storage for their own search programs. The recognised data format for CD-ROMs is the ISO 9660 format.

### What to look for

**Interface** To interface to the PC, you will require either an open expansion slot or free port. Portable CD-ROM drives will tend

to interface via a parallel or serial port. Some drives will interface via a proprietary board. In most cases this may mean that you will be unable to daisy-chain devices as you would be able to if the drive uses a standard SCSI or SCSI-2 interface.

**Speed** CD-ROMs are comparatively slow compared to other storage media such as hard disks. However, newer technology which enables the disk to spin at increased rates can effectively double the data transfer rate to 300Kbps.

**Bundles** For many users, the reason for buying CD-ROM drives will be for multimedia. Do not overlook multimedia packs, which may include the CD-ROM drive and interface kit, sound card, speakers and CD-ROM titles.

Name	Distributor	Manufacturer	Unit form	Interface	Buffer size (K)	Average access time (ms)	Average transfer rate (K/s)	Warranty	Price (including tax)
Apple CD 300	Apple Computer (02) 452 8000	Apple Computer	I, E	SCSI	256	280	300	12 months	\$1295
Apple CD150	Apple Computer (02) 452 8000	Apple Computer	E	SCSI	64	380	150	12 months	\$895
Backpack CD-ROM	ACA Pacific (03) 388 0477	MicroSolutions	E	Parallel port	128	350	150	12 months	\$1025
CD Porta-Drive T3401	SCSI (02) 894 6033	CD Technology	E	SCSI, SCSI2	256	200	330	12 months	From \$1195
Mitsumi CD-ROM	Nucleus Computer Services (03) 560 1388 Edge Technology (02) 906 5550	Mitsumi	I	Proprietary	32	350	175	12 months	From \$595
MS16050	Advance Peripherals (02) 983 9666	MicroSolutions	E	Parallel Port	128	350	150	12 months	\$838
NEC CDR 25	NEC Home Electronics (02) 868 1811	NEC Home Electronics	E	Quasi SCSI	64	450	64	12 months	\$563
NEC CDR 500	NEC Home Electronics (02) 868 1811	NEC Home Electronics	I	SCSI	256	200	450	12 months	\$1130
NEC CDR 600	NEC Home Electronics (02) 868 1811	NEC Home Electronics	E	SCSI	256	200	450	12 months	\$1275
NEC CDR 74-1	NEC Home Electronics (02) 868 1811	NEC Home Electronics	E	SCSI	256	280	300	12 months	\$1175
NEC CDR 84-1	NEC Home Electronics (02) 868 1811	NEC Home Electronics	I	SCSI	256	280	300	12 months	\$1030

### KEY

Unit form

I — internal

E — external

N/S — Not specified



## CD-ROM DRIVES

Name	Distributor	Manufacturer	Unit form	Interface	Buffer size (K)	Average access time (ms)	Average transfer rate (K/s)	Warranty	Price (including tax)
Panasonic CR-5016/S	Multimedia Technology (02) 853 6700	Panasonic	I, E	SCSI	0	390	150	12 months	From \$530 (B), \$612 (S)
Panasonic CR-532 B/S	Multimedia Technology (02) 853 6700	Panasonic	I, E	SCSI-2	128	290	306	12 months	From \$743 (B), \$893 (S)
Panasonic PCR-562	Multimedia Technology (02) 853 6700	Panasonic	I	S or AT bus	64	320	300	12 months	From \$412
Philips CDD-521	Philips Components (02) 805 4455	Philips LMS	E	SCSI-2	N/S	1000	300	2 years	\$10, 900
Philips CM-205	Philips Components (02) 805 4455	Philips LMS	I	Serial	32	375	150	2 years	\$620
Philips CM206	Philips Components (02) 805 4455	Philips LMS	I	Serial	64	350	300	2 years	\$699
Philips CM215	Philips Components (02) 805 4455	Philips LMS	I	SCSI-2	64	360	150	2 years	\$650
Philips CM 225	Philips Components (02) 805 4455	Philips LMS	E	Serial	32	375	150	2 years	\$699
Philips CM235	Philips Components (02) 805 4455	Philips LMS	E	SCSI-2	64	360	150	2 years	N/S
Pioneer DRM-604X	Pioneer Electronics (03) 580 9911	Pioneer	E	SCSI	128	320	614	N/S	\$3420
SDI SCD 683 Portable CD-ROM	Advanced Portable Technology (02) 975 4466	Storage Devices	E	Parallel port, SCSI	0	350	150	12 months	\$1521
Sony CDU-31A	Sony (02) 987 6667	Sony	I	AT bus card	64	490	150	12 months	\$650
Sony CDU-561	Sony (02) 987 6667	Sony	I	SCSI-2	256	280	300	12 months	\$1147
Teac T-3024	SCSI (02) 894 6033	Teac	I	SCSI-2	64	265	300	12 months	\$895
Teac T-5024	SCSI (02) 894 6033	Teac	E	SCSI-2	64	265	300	12 months	\$995

### KEY

Unit form

I — Internal

E — External

N/S — Not specified

## PRINTER SELECTOR CHOICES

Printer	Speed	Typical direct price	Notes
Laser/LED mono	4-16ppm	\$1400+	Quality printing at 5000 pages a month
Laser colour	1-3ppm	\$7000+	Pretty but expensive
Inkjet	120-400cps	\$700+	Effective
Dot matrix 24-pin	500cps	\$600+	Good for business use
Portable inkjet	150cps	\$500+	Can be fiddly and expensive to run
Photographic quality	3.5 min per A4	\$20,000	Only for publishers
Label printer	12 sec per label	\$300	Very specific use
Inkjet plotter	under 6 min per A0	\$12,500+	Drawing office use
Pen plotter	95cm per sec	\$7000	Ideal for low-cost CAD

NB: 'ppm' = pages per minute, 'cps' = characters per second

Continued from page 43

influenced by the speed of other components. In the end, the most accurate assessment of your application speed across hardware platforms should involve running a specific task. For example, if you want to use your PC as a graphics workstation running Windows, then a simple recursive macro which redraws repeatedly will give a good indication of its suitability.

Remember, any figures are better than none at all. You can split common benchmarking into groups: hardware component tests, and hardware applications tests. Hardware tests stress each aspect of a PC's basic functions. For example, to test the speed of a component a file is written and then read repeatedly. The size of the file is changed and the test repeated. Eventually, a large body of information is built up which is directly comparable across machines. This style of component testing is usually applied in three areas: CPU, disk and video.


You can test different brands of products against each other using component testing. This could involve enabling and disabling a processor cache or disk cache, installing more memory, or swapping video cards. This will have clearly definable effects on tests, allowing you to

compare the performance of the parts of any PC with reasonable accuracy.

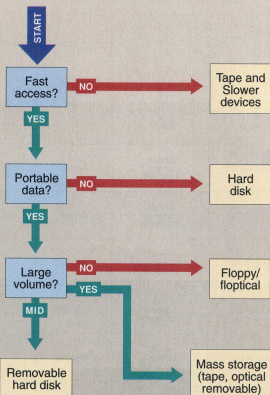
## How to test software

Software testing is more straightforward than hardware testing. It either does what you want it to, or it doesn't. Unfortunately it's not too easy to obtain software purely for testing purposes before you buy. Try asking the retailer to demonstrate the product, then work on existing files which you know the details of. However, the benchmark results you see published in magazines are generally accurate and very revealing. As long as the packages can perform equivalent functions, and they are tested across identical hardware configurations, the results will be the most reliable comparative tests you will see.

## How to find more on benchmarks

Magazine benchmarks are often distributed free via bulletin boards; if you want to know where to find them, check the After Hours communications section in *APC*. CompuServe will also have details of various testing routines in its many forums, and many shareware and freeware test programs are available from retailers. 

## STORAGE SELECTOR



## Benchmarks: buyer's checklist

**PC Labs** This is the test suite used by *APC*. If you want a full set of tests, you can't get better than these. There are tests for every single system component, with each component tested in several different ways.

**Norton SI** Norton's SI runs two tests: a processor-based computing index (CI) and a disk-based disk index (DI). These are combined to get the final SI figure, expressing the performance as a multiple of the performance of an IBM XT.

**Landmark** Landmark's famous Speed test is sold as a standalone application or as part of PC Probe, the diagnostic program. Landmark reports in simulated megahertz, based on the results of the test. If the test is completed three times as fast as an IBM XT running at 4.77MHz, then Landmark reports 14.31MHz (4.77x3) as its rating.

**Power Meter** Power Meter is the premier commercially-available benchmarking software. It keeps its own database of test results and reports which can be merged, making it not only a testing program but a central data resource too.

**Winbench** A set of Windows-specific benchmarks based on video performance. The newest version has a quick test, with a single number result.

**Wintach** Written specifically for software suitability testing by Texas Instruments. Gives a good idea of how PCs perform under load conditions.

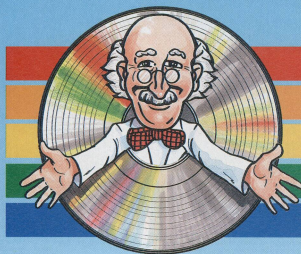
**Coretest** Core International has a simple test which you can sometimes find quoted. It reports an average seek time, track-to-track seek and data transfer rate.

**PC Tools** Gives a standard and comparative idea of hardware speed and potential with optimisation.









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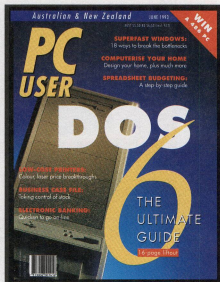
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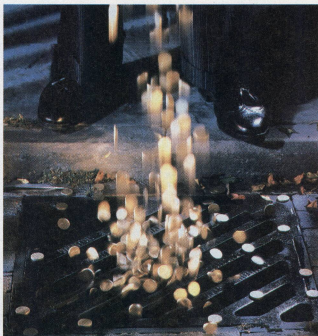
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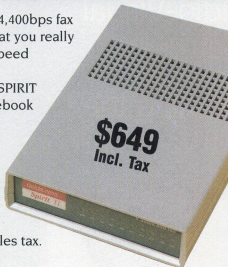
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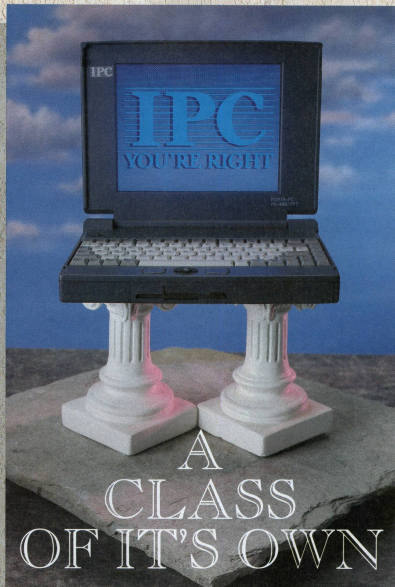


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The table below shows various attributes of 80386-based computers available in Australia today. The 80386DX machines have a 32-bit data bus (the 386SX has a 16-bit bus) and can transfer data to and from memory more quickly. They are more powerful than a 386SX-based machine in that they can also run at a greater clock speed. We have only listed configurations where the speed of the processor changes. The machines below may come in various configurations with hard disk capacity, monitor or memory being optional.

### Things to look for

**Expansion** Check the expansion capabilities of the machine with the number of free expansion slots. Also find out if there are free disk bays available for more disk drives. Look for machines that have the hard disk controller and graphics adaptor on the motherboard, thus saving expense and expansion slots.

**Desktop or tower** This is a description of the physical aspect of the unit. If space is a consideration, a tower system which sits on the floor or a slimline desktop may be appropriate.

**Upgrades** Some machines are (processor) chip upgradable to a higher processor.

**Warranty** The length and type of warranty differs quite significantly between distributors. With onsite warranty there is normally a guaranteed response time — usually with PCs it is eight hours. Return to base warranty refers to the sending of the machine to the service depot at the manufacturer, dealer or service agent. With return to base warranty, normally all freight charges are the customer's responsibility.

It may be possible to upgrade from a return to base type warranty to an onsite warranty at a minimal cost. If you are using the computer as a file server, then onsite warranty and service become important factors.

### Explanation of terms

**Maximum RAM on motherboard** This refers to the maximum amount of memory that can be populated directly on the motherboard without the use of an add-in board.

**Number of expansion slots** The total number of expansion slots provided in the machine — not the available number of slots. The number in the square brackets refers to the type of slot, ie, 8, 16 or 32-bit. You should also refer to the bus type/architecture question earlier in the table.

**Bundled items** Software and hardware sold with the computer. You should check that these items are still part of the system as the bundling of software may be part of a limited promotion.

**Warranty** Only comprehensive (parts and labour) warranty period has been stated. Some distributors have a longer warranty on the labour component.

Name	Distributor	Manufacturer	CPU manufacturer	Processor	CPU speed (MHz)	Bus type	Standard RAM on motherboard (M)	Maximum RAM on motherboard (M)	Maximum external RAM cache (K)	Monitor in base configuration	Hard disk capacity (M)	Number of parallel ports	Number of serial ports	Number/type of expansion slots	Bundled items	Warranty	Price (including tax)
AGI 3000B	Multisource (02) 955 8100	Everex	I	SX	20	I	2	8	256	None	0	1	1	8	None	12 months	\$1416
Alpha 305/40	New Concept (03) 388 0087	New Concept	A	DX	40	I	4	32	128	None	0	1	2	6(16)	None	12 months	\$850
AMS 3250X	Multisource (02) 955 8100	Multisource	I	DX	25	T	4	32	256	SVGA	0	1	2	8	None	12 months	\$1830
Arrow 386DX-40	All Data (03) 794 5799	All Data	A	DX	40	I	1	32	128	SVGA (I)	85	1	2	1(8), 6(16)	D6.0	5 years	\$1890
ASI 386SX-25	Anabelle Bits (02) 313 8155	Anabelle Bits	A	SX	25	I	1	16	0	SVGA	43	1	2	6(16)	D, [W], mouse	2 years	N/S
Austin 3400	Hartland (02) 313 4133	Hartland	A	DX	40	I	4	32	128	SVGA	120	1	2	6(16), 2(8)	D, mouse, mat, [W]	12 months	\$2026
AVO 386DX/40 Cache	AVO (02) 906 2655	AVO	A	DX	40	I	4	32	128	SVGA	120	1	2	1(8), 7(16)	None	12 months	\$1980

#### KEY

CPU manufacturer

I — Intel, A — AMD

Bus type

I — ISA, V — Local (VESA)

Monitor in configuration

(N) — Non-Interlaced, (I) — Interlaced

Number/type of expansion slots

(8) — 8 bit, (16) — 16 bit, (32) — 32 bit, I — ISA, V — Local (VESA)

Bundled items

D — DOS, [W] — Windows

N/S — Not specified

# 386-BASED DESKTOPS

Name	Distributor	Manufacturer	CPU manufacturer	Processor	CPU speed (MHz)	Bus type	Standard RAM on motherboard (M)	Maximum RAM on motherboard (M)	Maximum external RAM (K)	Monitor in base configuration	Hard disk capacity (M)	Number of parallel ports	Number of serial ports	Number/type of expansion slots	Bundled items	Warranty	Price (including tax)
Baseline 386DX/40	PPL (03) 776 6423	PPL	A	DX	40	I	4	32	128	SVGA	120	1	2	6[16], 1[8]	None	12 months	\$1665
CLUB 386/25	Multisource (02) 955 8100	CLUB American	I	DX	25	I	4	64	0	None	0	1	2	7[16], 1[32] proprietary	D5.0	2 years	\$2131
CLUB 386/33	Multisource (02) 955 8100	CLUB American	I	DX	33	I	4	64	64	None	0	1	3	7[16], 1[32] proprietary	D5.0	2 years	\$2298
CLUB 386/40	Multisource (02) 955 8100	CLUB American	A	DX	40	I	4	64	64	None	0	1	2	7[16], 1[32] proprietary	D5.0	2 years	\$2310
Compwell Pro S Series	Compwell (02) 569 3700	Compwell	I	DX	33	I	4	32	256	SVGA (NI)	130	1	2	8	D6.0, [W3.1, D	3 years	\$2600
Everex Slip 386/33	Multisource (02) 955 8100	Everex	I	DX	33	I	4	64	256	None	0	1	2	2[8], 6[16]	Mouse, [W3.1, D	12 months	\$3300
Express 386DX/40	Express Solutions (02) 981 1255	Express Solutions	A	DX	40	I	4	32	256	SVGA	130	1	2	8, 2V	None	12 months	\$1620
GA 386DX-40U	G & A (02) 718 1160	G & A	A	DX	40	LV	4	32	256	SVGA	130	1	2	6[16], 2V	Mouse, D6.0, [W3.1	12 months	\$1900
IPS 386DX-40I	Intelligent Printing Systems (02) 906 7855	Intelligent Printing Systems	A	DX	40	I	4	32	128	SVGA (NI)	170	1	2	1[8], 6[16]	D6.0	12 months	\$1980
IPS 386SX-33I	Intelligent Printing Systems (02) 906 7855	Intelligent Printing Systems	A	SX	33	I	4	16	0	SVGA (I)	170	1	2	6[16]	D5.0, [W3.1, mouse	12 months	\$1765
IPS 386SX-40I	Intelligent Printing Systems (02) 906 7855	Intelligent Printing Systems	A	SX	40	I	4	16	0	SVGA (I)	170	1	2	6[16]	D6.0	12 months	\$1795
Labtam 386/40	Labtam (03) 587 1444	Labtam	A	DX	40	I	4	16	256	VGA	120	1	2	7	Mouse, D6.0	12 months	\$2465
Netl 386DX-40I	Netl Computers (02) 417 5385	Netl	A	DX	40	I	4	32	256	SVGA (NI)	105	1	3	7	Dust cover	12 months	\$2140
Peripherals Plus 386DX-40	Peripherals Plus (02) 630 3166	Peripherals Plus	A	DX	40	I	4	32	128	SVGA	105	1	2	6[16]	None	2 years	\$1775
PPL 386DX/40	PPL (03) 776 6423	PPL	A	DX	40	I	4	32	128	SVGA	120	1	2	6[16], 1[8]	Mouse, mat	2 years	\$1812
ProLinea 3/22s	Compaq Computer (02) 911 1999	Compaq	I	SX	25	I	2	16	0	None	84	1	2	3	D5.0, [W3.1, mouse	3 years	\$1987
ProLinea 3/22cs	Compaq Computer (02) 911 1999	Compaq	I	SX	25	I	2	16	0	None	84	1	2	2	D5.0, [W3.1, mouse	3 years	\$1816
Supercom 386	Magic Computers (02) 212 3944	Magic	A	DX	40	I	2	32	256	SVGA	105	1	2	2[8], 6[16]	D6.0, [W3.1, mouse	3 years	\$2100
Supercom 386SX	Magic Computers (02) 212 3944	Magic	A	SX	33	I	1	16	64	SVGA	40	1	2	2[8], 6[16]	D6.0, [W3.1, mouse	3 years	\$1780
VS 386DX/66	Computer Vision (03) 585 1888	Computer Vision	I	DX	40	I	4	32	256	UMGA	85	1	2	6[16]	N/S	2 years	\$2180

## KEY

CPU manufacturer

Bus type

Monitor in configuration

Number/type of expansion slots

Bundled items

I — Intel, A — AMD

I — ISA, V — Local (VESA)

(NI) — Non-interlaced, (I) — Interlaced

[6] — 6 bit, [16] — 16 bit, [32] — 32 bit, I — ISA, V — Local (VESA)

D — DOS, [W] — Windows

N/S — Not specified



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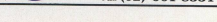
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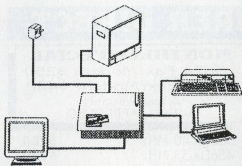
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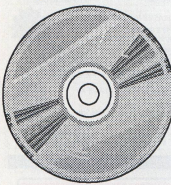
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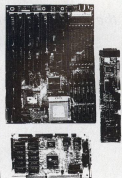
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*Hot gossip from the industry this month includes Borland rightsizing the wrong person, the V8 mouse, and product launches — the good, the bad and the 'armless.*

## BY CHIP CHAT

Staff cutbacks are usually designed to lower overheads and make a company more efficient. In Borland, a round of cutbacks certainly lowered overheads, but it also mistakenly cost the company one of its best programmers. When the redundancy letters were sent out, one went to Sin Lew, the man behind the Borland's slick new C++ compiler, and a man with a namesake in a far less important corner of the Borland empire. Lew was completely taken aback at his apparent dismissal, but cleared his desk and headed out the door. A few days later, after Borland management started asking where Lew was, the personnel department realised that there had been a minor administrative error — they had sacked the wrong Lew! Desperate to get him back, Borland supremo Philip Kahn phoned Lew, grovelled, apologised and even offered a substantial payrise, if Lew agreed to return. Some of Lew's reply can't be printed in these pages, but he told Kahn that he already had another job — with arch-rival Microsoft. Microsoft had offered Lew a job within an hour of his walking out Borland's door. Lew is now leading Microsoft's PowerPC compiler project and really



*Sydney's famous 'get out and run yourself into the ground' City to Surf run, held this year on Sunday, August 8th, attracts all sorts. The over-excited mob in this photograph? Microsoft, of course — and Gary wasn't there!*

smoking, according to a Microsoft executive. "Because of his contribution, we'll be demoing MS apps running native on Mac/PowerPC the day Apple announces their new systems," he said. As for Borland, any delays in its NT compiler might be due to personnel, not technical reasons.

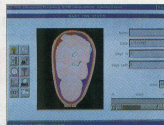


Microsoft's new mouse may be more practical than the old, but if you want to be one up on your mates, you really need a MotorMouse. As the name suggests, these

Canadian-built mice look like cars. There are snazzy red and white Lamborghinis or red and yellow Corvette models to choose from. The accompanying software lends new meaning to the term, 'driver'. The MotorMouse driver transforms the cursor from an arrow to a car, and the middle mouse button becomes a horn or a revving engine. If the petrol-head in you is desperate for the ultimate desktop accessory, MotorMouse Products Inc, which sells the car mice, takes faxed international orders. The price is \$US69.95, and the fax number is (604) 988 4495.



Chip Chat's enthusiasm for intriguing, offbeat software was fired by a recent press release from Dataflow Computer Services, extolling the virtues of an imported program called B.A.B.Y. The acronym stands for Birth and Baby Years, and the program is an MS-DOS pregnancy guide. The \$79.95 program won't take the place of antenatal classes, but has some features you won't find in books, such as animations showing the stages of pregnancy and birth, and an interactive fertility calculator. As with a book, you can enter personal and medical data and tick off baby items as you get them. There is also practical advice on diet, exercise, feeding and even a database of names. So, if computers are getting in the way of a new family, and you can't drag your other half away from their computer screen, B.A.B.Y. might be just the program to get!





## Down the line

**Horns of a Dilemma Dept** So there I am roaming around the Client-Server Computing Show in Boston. There before everyone is IBM's Personal Computer Company showing — get this — a **370 mainframe on a single Micro Channel card**. Designed by one of the superstar IBM fellows at Poughkeepsie, it has one tenth the power of the largest mainframe IBM sells. One IBMer told me that the gate-array used on the card is probably the **most complex** ever developed. So the thing was sitting in the new IBM 295 file server and pretending to be a mainframe. You could walk over to a **Value-Point** el cheapo machine and run **VMI**. It was awesome, dude! And I must say that anyone looking for a **kick-butt** file server that looks expensive and substantial should check out the 295. It's something to behold. Dual 50MHz 486, RAID 5, and it even has castors. I guess that means IBM is on a roll!

**Interface Wars Dept** Novell goes on the offensive with WABI. Apparently, Novell has managed to produce a **Windows Application Binary Interface** and intends to link it into the next release of DR DOS or make it an **add-in module**. The problem is that while Novell has the ability to run Windows programs, it doesn't have the Windows interface — or any GUI for that matter. I suspect that most of the vendors who do this sort of thing will use **Motif**, which seems pretty compatible with the Windows requirements. IBM, of course, will simply use the OS/2 parameters when it releases WABI code

to allow Windows programs to run under **OS/2 native mode**. Well, it seems as if Novell might take the big step and **license the Macintosh user interface from Apple**. Insiders report that a deal was done and the Mac interface will be a front-end for Windows programs running under a Novell OS. Is this going to be **compatible** or what?

I think the real battles of the 1990s will be fought on the interface front, where people will **choose the interface** — not the operating system — they prefer. This assumes that OS functionality stabilises and you can indeed do real multitasking, for example, on all the systems.

**Unalterable Trends Dept** If there's ever going to be a flood of **cheap monitors**, it'll have to wait until after all the expensive monitors flood the market. When that's over, the expensive monitors will be cheap.

It seems that every company that knows how to put some electronics on the back of a good tube will release monitors — mostly to compete with the NEC xFG line. That seems to be the target. **IBM** is creating a monitor division to sell monitors to everyone. **Acer** is building a monitor plant in Taiwan to blow out 16in and eventually 21in hi-res tubes. **Philips** is bringing out a whole line of hi-res tubes. And these companies are just the beginning. Folks, this will be a **bloodbath**.



Some companies will do almost anything to get publicity for a new product. The company charged with promoting Star Micronics passed a mock funeral and offered a free printer to any scribe prepared to be in on the gig. The bribe was probably essential, given that printer launches are generally about as exciting as watching paint drying. In this industry, free goodies aren't uncommon, and one journo dutifully left with a free colour printer, having guessed the RRP of the product. The others had to make do with a mock funeral for a printer technology that would be, in theory, killed off by Star's latest 'heat fusion' colour. The old printer was interred in a coffin and all the formalities of a funeral were observed, particularly the wake.



Other companies take a more traditional approach to product launches, such as giving away T-shirts, mugs and other trinkets. In launching WordPerfect 6.0, Word-

Perfect Pacific took this approach, and how? Chip Chat received a large box, called a WordPerfect Six Pack, containing the following items — one WordPerfect 6.0 T-shirt, one WordPerfect 6.0 coffee mug, one WordPerfect 6.0 mouse, one WordPerfect 6.0 mouse mat, one WordPerfect 6.0 brochure and, of course, one WordPerfect 6.0 program. The only thing missing was the WordPerfect 6.0 press release, with details on pricing and positioning. Better luck next time, guys.



Another strange object to arrive in the Chip Chat office was a shirt sleeve. Yes, the left sleeve of a shirt. It was sent by Software Publishing Corporation as a teaser for the launch of the latest version of Harvard Graphics for Windows. The connection? An accompanying note said that SPC would be holding a magical demonstration of the product and had nothing up its sleeve — well, the left sleeve anyway. Chip Chat will be observing the right arm very closely.



How to upset customers. InfoMagic, the local Aldus distributor, thought it was doing the right thing by mailing customers about discounted licence upgrades. The tack it took was rather alarmist though, for the letter, from InfoMagic's managing director, Richard Graham, began: "I am writing regarding the sensitive issue of illegal possession of unauthorised copies of software." He then went on to talk about the Business Software Association of Australia's 'dob in a software pirate' scheme, putting the fear of God into readers, before coming to the point of offering discounted licences. The letter received so many complaints that the local Aldus boss, Graham Freeman, was forced to write to Aldus customers apologising for the letter and any offence it might have caused.



Some of us think that acronyms are getting out of hand. Chip Chat recently came across this passage in a book from Wellfleet, explaining how to integrate SNA and multi-protocol LAN networks. "When a CC (or PC gateway) sets up an LLC session with a TAC-attached FEP, it must know the FEP's MAC address, and the SAP address for the FEP's SNA routing software (Path control)." Unless you are in the know, it is CAM (Clear as Mud). The passage inspired Chip Chat to create the CAM Awards. If you have come across any acronyms out of context, Chip Chat would like to know. Send examples to Chip Chat, Level 6, 54 Park St, Sydney NSW 2000. Chip Chat will be making CAM awards in the months to come.

## No more porn please, says US Macworld crowd

US Macworld organisers have reportedly received a spate of complaints about the featured appearance of Penthouse Pets, Dominique St Croix, Julie Strain and Natalie Lennox, advertising a game in which they croir.

Apart from the semi-clad women, several other stands displayed CD-based pornographic games, raising the ire of many of the participants who asserted that they had come to see new technologies such as Newton rather than be assaulted by the proliferation of computer porn. Organisers have taken the complaints seriously, and will preclude the displays of such material from next year onwards.



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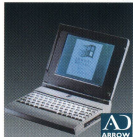
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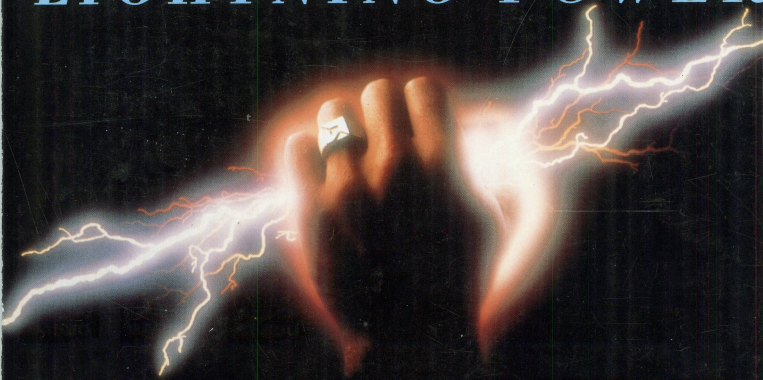


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